MARINE REVIEW.

VOL. XIII. CLEVELAND, O., JUNE 4, 1896. No. 23.

Urging Completion of Canada's Canals.

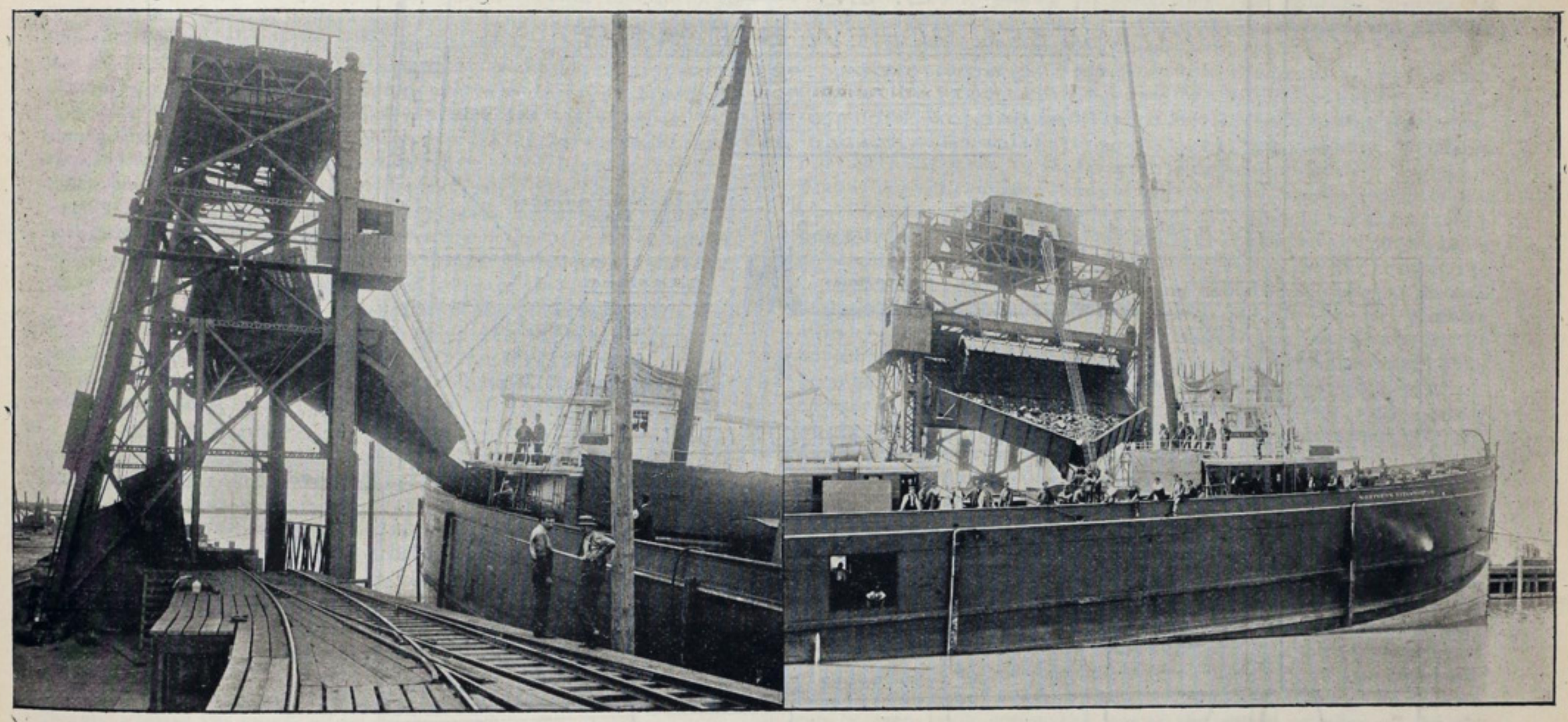
Thomas Monro, president of the Canadian Society of Civil Engineers, and a member of the Canadian Deep Waterways Commission, appointed recently to act with a similar commission from the United States, has spoken very plainly on several occasions of late of the great mistake made by Canada in limiting the size of locks in the Welland and St. Lawrence canals, when the big scheme of improving these canals was undertaken. He discusses the subject very intelligently in a paper read recently before the Canadian society. After reviewing the many causes that have resulted in low costs of transportation since the enlargment of Canadian canals was begun, he says:

"It is quite clear now that 4 cents at the outside will soon carry 60 pounds of grain from Chicago to New York, a distance of 1,368 miles—and pay a fair profit at that. It is this competitive rate we must face, when upon the completion of the canals to 14 feet, we shall be a position, notwithstanding the great mistake that has been made regarding dimensions, to try for a fair portion of the foreign export trade. The total expenditure on all of the canals—Sault Ste. Marie, Welland and St. Lawrence—up to June 30, 1895, was $50,129,783. Of this, about twenty millions were spent prior to confederation, so that about thirty millions have so far been expended on the enlargement. The works could easily be completed in less than three years from date if so desired.

"Great advantages are claimed for the St. Lawrence route, and its praises have been sung for years in somewhat stereotyped phrase. But, nevertheless, the western trade does not come this way. The principal reason for this is, of course, that the St. Lawrence does not lead to the chief market. The grain which descends from the lake region is largely consumed in the east, and not exported at all. Take, for example, the receipts at New York for 1894. 123,184,499 bushels were received there by the various routes from the interior, but the freight export was only a little over 62 millions. It is only for the latter half we can compete. We are "not in it" for the balance. Years ago it was thought that if grain once descended on to Lake Ontario, it would inevitably find its way to Montreal, for distribution or export. But it does not. More than half the tonnage which passes east through the Welland canal is between United States and United States ports; and one of the chief benefits which its enlargement has so far conferred upon commerce is to permit of a line of American propellers being profitably established between Chicago and Ogdensburg. With reference to the foreign export trade of the St. Lawrence, it is a significant fact that the sea-going tonnage of the port of Montreal has remained at about the same figure for several years, whilst the trade of Buffalo has doubled since 1886, and was, in 1895, 9,612,423 tons, that of Montreal being officially given at 1,069,386 tons. Even with similar freight rates, the trade will go via Buffalo to New York. The reason of this is not far to seek. New York is the commercial metropolis of North America. It is a great money centre. The imports are enormous; and it is an acknowledged fact that the route upon which a large import trade is done will invariably be the commercial favorite, and command freights both ways. The exports of an agricultural country are naturally bulky and can not stand high transportation charges. If therefore a route has little or no back freights, it has but a poor chance of success unless the cost of carraige outwards or to the seaboard is so much reduced as to offset the manifest advantages above alluded to. In addition to other drawbacks, the port of Montreal is closed for nearly half the year, whilst those on the Atlantic coast are open all the year round.

"My views on the whole question of the St. Lawrence route may be considered pessimistic. But it is better to draw attention to the formidable rivalry which may be counted upon for the export of even our own products, than be led into the belief that the St. Lawrence, when the canals are enlarged, will possess a very great superiority over other routes for the export trade of the west. Nevertheless, it seems to me that so soon as a vessel of say 2,000 tons can get down from Lake Superior to Montreal without breaking bulk, immediate advantage will be taken of this to introduce a cheaply-built class of steel propeller and consort of the full size of the locks, and with such reduced running expenses as will enable the present grain rate to be cut in two, or at least so materially reduce charges that we shall be able to wipe out the present antequated system of transport, and at last stand the chance of getting a fair share of the through trans-atlantic trade. If the St. Lawrence route can secure even the overflow of the enormous lake grain traffic, the large sums which Canada has so pluckily spent on her canal system will even yet yield her an abundant return. Our neighbors realize this. An astute American observer quite recently made the following remarks: 'It must be borne in mind that Canada has not realized the advantages of her great expenditure, because her canal system is not yet complete. The strength of a chain is the strength of its weakest link. The capacity of a navigation system is measured at its point of least capacity. These canals will be finished within two years, and then the Canadian 14-foot system will be in full working order from Lake Superior to Montreal. There will be no weak link in the chain then, and we will feel it pinch.'

No further time should be lost in securing the substantial advantages of this main line of navigation, which has been under construction since shortly after confederation. It has cost, as before stated, from the beginning, about $53,500,000, without there being, so far, any adequate return for such a vast outlay. Before, however, full success can be achieved for the St. Lawrence route, the harbor of Montreal must be adapted for the rapid transfer of whole cargoes from the inland vessel to the ocean steamer."

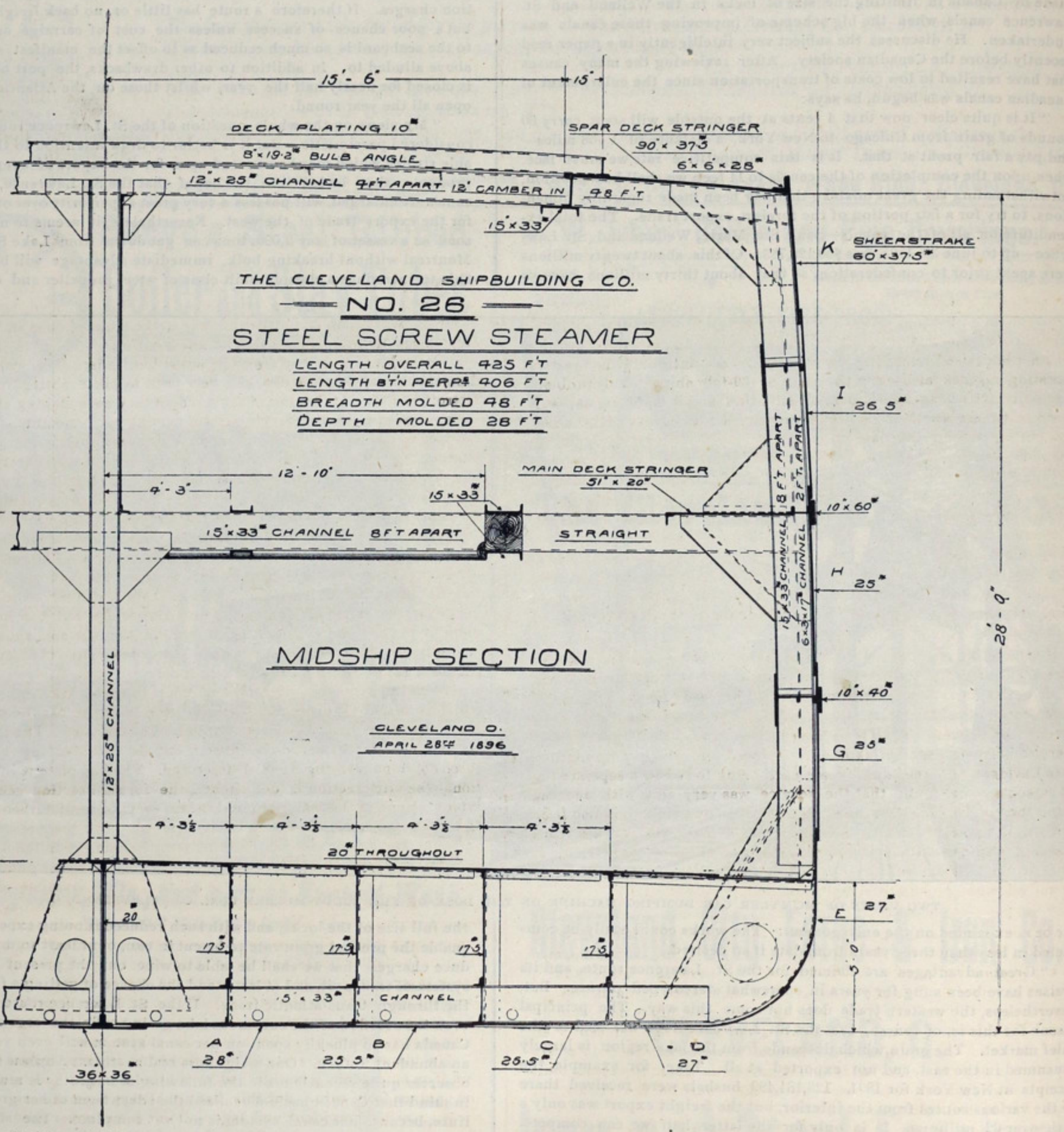


TWO VIEWS OF MCMYLER CAR DUMPING MACHINE ON THE DOCK OF THE CUDDY-MULLEN COAL CO., CLEVELAND, O.

Rockefeller Ships.

DESCRIPTION OF A THIRD VESSEL OF THE BIG FLEET—THE STEAMER UNDER CONSTRUCTION AT THE YARD OF THE CLEVELAND SHIP BUILDING CO.

In the REVIEW of April 30, 1896, a description of the twelve steel ships—seven steamers and five barges—building for Mr. John D. Rockefeller in lake ship yards was promised. The issue referred to contained a description and cross-sectional drawing of the two duplicate steamers building at the yard of the Globe Iron Works Company, Cleveland. A midship section of another of these ships, the steamer building at the yard of the Cleveland Ship Building Co. is presented herewith.



MIDSHIP SECTION OF FREIGHT STEAMER TO BE BUILT BY THE CLEVELAND SHIP BUILDING CO. FOR MR. JOHN D. ROCKEFELLER.

This steamer will probably be the last of the fleet to go into commission, as was understood when the contracts were let. She is 426 feet over all, 406 feet between perpendiculars, 48 feet beam and 29 feet deep at the shallowest point amidships. She is built throughout on the channel bar system of construction, and is being surveyed and classed in the United States Standard Steamship Owners', Builders' & Underwriters' Association, for an A1 class for twenty-five years. Her water bottom is 5½ feet deep. The tank top is entirely plated with heavy steel and has no wood ceiling whatever. The cargo hold is divided into four compartments by screen bulkheads. She has main deck beams 8 feet apart but no deck. In the steel spar deck there are twelve hatches, spaced 24 feet centers. She will have a steam windlass and capstan forward, two steam deck capstans amidships, one steam capstan aft, and one of the builders' double hoisting engines forward of amidships. Cabins will be of the usual barge style, built of steel throughout, and there will be two pole spars. A double set of electric light dynamos and engines will permit of every part of the ship being well lighted with electricity.

The motive power will consist of a triple expansion engine having a high pressure cylinder of 25 inches diameter, an intermediate cylinder of 41 inches diameter, and a low pressure cylinder of 68 inches diameter, with stroke of 42 inches. There will be three boilers of Scotch type, each 13 feet in diameter and 13 feet long, to be allowed 175 pounds of steam to the square inch. It is calculated that this steamer will carry 4,000 gross tons of ore on a draught of 14½ feet, or about 6,000 gross tons on a draught of 18 feet. Her cost will be about $260,000 and she will be completed about Oct. 1.

The Nickel Plate road sells homeseekers' excursion tickets to the south, June 16, July 17 and 21, Aug. 4 and 18, Sept. 1 and 15, Oct. 6 and 20. For detailed information write any agent of the Nickel Plate road, or address B. F. Horner, general passenger agent, Cleveland, O. 108-30

Insurance Valuations.

Although it would seem that all vessel owners on the lakes would like to have their ships valued up to the top notch in insurance registers, such is not the case. In a great many instances the publishers of the Inland Lloyd's Register find difficulty in getting the consent of owners of big new steel vessels to what might be regarded as a fair valuation. For reasons best known to themselves, these owners want values placed below the actual cost of their ships. Then there are other cases in which high values are sought. In the June supplement to the Inland Lloyd's Register, for instance, the steel schooner Geo. E. Hartnell of Detroit, which actually cost $130,000 on a contract that was decidedly favorable to her owners, is valued at only $125,000, while the steel steamer Geo. N. Orr, which cost $190,000, is valued at $200,000. The value placed on the Orr is not too high, but it would certainly seem that about $15,000 could reasonably be added to the Hartnell's valuation without criticism and in order to equalize, as a whole, the figures in the register. Other particulars of new boats in the supplement are as follows: Steam—City of Buffalo, Cleveland & Buffalo Transit Co., Cleveland, $250,000, A1; Edna G., tug, J. L. Greatsinger and others, Duluth, $35,000, A1; Bloomer Girl, Thomas Richardson, Milwaukee, $12,000, A1; Governor Morton, police patrol boat, Buffalo, $5,000, A1½. Sail—Armenia, James Davidson, West Bay City, $85,000, A1*; Connelly Bros., owned by Connelly Bros., Buffalo, $40,000; A1*; Mikado, barge, James Davidson, West Bay City, $10,000, B1; Tycoon' barge, James Davidson, West Bay City, $10,000, B1.

Ship Yard Matters.

In the big freight steamer that is to be built at South Chicago for A. B. Wolvin and others of Duluth, and which is not to go into commission until 1897, an attempt is to be made to solve, in part, the question that has been raised regarding the advisability of continuing the practice of locating engines far back in the stern of 400-foot ships. This problem is certainly attracting a great deal of attention, and it is, of course, well known that there would be no hesitatancy in placing engines nearer amidships but for the disadvantage that would be encountered in handling cargo, on account of all dock equipment being fixed for ships with machinery in the stern. Mr. Wolvin's plans contemplate a marked change in the distribution of weights for his new boat. The rules of all societies engaged in the classification of ships provide for a lightening up of material in bow and stern. He proposes, therefore, to continue the lightening process in the forward part of the vessel to a point nearer amidships than would be permitted in a ship with engines in the center, and then to add the material thus saved to the after part of the boat at the point where it is most required on account of the great weight of engines and boilers in the stern.

It is expected that the tug S. M. Fischer and the two car ferry barges which the Craig Ship Building Co. of Toledo is building for the Lake Michigan Car Ferry Transportatton Co., will be ready for service on the South Chicago-Peshtigo route about July 1. The barges are 317 by 46 by 14 feet. One of them was launched two weeks ago. The barges already in service between Peshtigo and South Chicago, and which were built by James Davidson of West Bay City, are each being towed by a separate tug this season. It was found that the service was very slow with one tug towing the two barges. The new tug S. M. Fischer, which has also been launched, is a powerful craft. She is 148 by 30 by 17 feet and has triple expansion engines with cylinders 18, 30 and 50 inches diameter by 36 inches stroke. Steam will be supplied by two boilers, each 11½ by 11½ feet and allowed 170 pounds steam pressure.

It has been remarked that Capt. James Davidson of West Bay City has gone to distant lands, including the East Indies and Africa for such names for his vessels as Australasia, Tasmania, Algeria, Abyssinia, etc., The explanation is simple. He is opposed to personal names from a business standpoint. He has several times been asked to name vessels for prominent shippers of grain, coal and ore, who might feel complimented and favor the vessels named for them, but he has refused in all cases. He is of the opinion that personal names sometimes interfere with the sale of a ship. Personal names have been given to vessels built by Capt. Davidson, in some cases while they were on the stocks, but always after he had sold them.

F. W. Wheeler & Co., ship builders of West Bay City, have made many friends among ship owners by a liberal spirit in every detail of "fit out" on vessels which they build. The new steamer L. C. Waldo is a great specimen of Mr. Wheeler's policy in this regard. There is not even the smallest bit of workmanship in her cabins to be criticized and everything aboard the vessel is of the very best quality. It is quite certain that, even under rigid specifications, the builders of this vessel could, if they were so disposed, have fitted her out at a big reduction on the cost attending her elegant arrangement of cabins and other parts that are usually left to the builders.

There is no truth in the statement that the Bessemer Steamship Co. will soon let contracts for two more steel tow barges. The rumor was started by a remark from the manager of the company, Mr. Bowers, about having nine steamers and only seven tow barges. When the vessels are all in commission it may be found that the number of tow barges is sufficient, and anyhow it is understood that the construction of additional vessels for this fleet will depend entirely upon conditions that are met with when preparations are being made for another year's business.

Wreck of the Merida's Machinery.

An accident unprecedented in the annals of the lake marine occurred to the engines of the fine steamer Merida on Tuesday evening, May 26. About 10 p. m., when off Sand Beach, up bound, light, the chief engineer, Mr. Jas. Balfour, and the assistant on watch at the time, felt and heard a shock, and the engines immediately commenced to race with lightning-like rapidity. Before either of them could step to the throttle and close it the engines commenced to go to pieces. Mr. Balfour however succeeded in closing it, and both men made their escape from the engine room. The engines are a complete wreck, so complete in fact that hardly a sound member or part remains. The well-remembered disaster to the City of Paris was not so complete in its utter ruin as is this.

The illustrations (which were photographed for the REVIEW) give but a faint idea of the reality. Fortunately no one was hurt by the smashup, though Mr. Balfour, after gaining the deck, had the misfortune to fall through an open hatchway into the hold, a distance of 26 feet. There was about 20 inches of water over the tank top, which was being carried for ballast, as is common with large metal steamers in good weather, and this broke his fall so that he escaped with a badly wrenched leg, which will lay him up for some time. He managed, however, to climb on deck again and made his way to the boiler house and shut the stop valves before realizing that he was hurt.

The engines were triple expansion with cylinders 23, 37 and 62 inches diameter by 44 inches stroke, and were built by the Frontier Iron Works, Detroit, in 1892. At the time of the accident they were making eighy revolutions per minute and everything was moving very smoothly. The shock referred to was caused by the wheel striking some obstruction, probably a floating log, with sufficient force to split the hub, as not a vestige of the wheel remains. That the engines could not withstand the strains set up by the sudden throwing off of the entire load and consequent racing is no wonder. Their collapse is directly traceable to the throwing of the counterbalance on the after low pressure crank, which broke out the side of the crank pit and carried away the guide column. The low pressure cylinder simply sank downwards and towards the port side, but in its fall the piston had at least one good rap at the cylinder cover, not only breaking the latter all the way round the flange, but the impact was enough to tear the cylinder apart around the bottom, showing how strongly the cover was bolted down. The cover flange is most of it left on the studs on the top end of the cylinder.

In falling the low pressure cylinder dragged the high pressure, which is next to it, over and it will be seen lying across the top of the low pressure cylinder, with its bottom broken out also. The intermediate cylinder, which was at the forward end, is still standing though the three columns carrying it are all fractured. The bed plate is in two sections; the after section is demolished, the forward section seems to be intact. None of the main journal binders seem to be disturbed, showing that the crank shaft can not be badly strained. The low pressure piston rod and connecting rod can both be seen hanging onto the crosshead, though bent into all kinds of shapes. The high pressure guide column can be seen lying across the top of the steam cylinder of the air pump. Altogether it is one of the most complete and thorough cases of total destruction ever witnessed, if indeed its equal ever occurred. The main steam pipe, fortunately, did not let go; it pulled out of the slip joint in the boiler house, and there being about 10 or 12 feet of space between that and the engine room bulkhead, the escaping steam spent its force without injury to any one. Had it let go at the throttle the consequences might and probably would have been awful, as the engineer's crew were quartered on either side of the engine room.

No blame or discredit can be attached to anyone, unless it be said that if an emergency governor had been fitted it might have acted to save the engines from ruin. But this has not always been the case— witness the City of Paris accident, and lake builders have never used them. All the fractures show sound, solid sections without an exception, not a sign of a flaw, nor even of a sand hole being visible in any of them. The Merida has been a most successful and satisfactory steamer and has been in many a tussle, and no boat she has locked horns with has ever left her behind. Every steamboat man will remembar the hot race between her and the steamer Curry three years ago.

Of course every such accident has its amusing features. In the midst of the general destruction, when big castings and forgings were "going to the demnition bow-wows," the little things came out all right. Steam guages, mounted on the side of the low pressure cylinder came out without a scratch. Frail oil cups stand unharmed in the midst of tons of scrap. The levers of the handling gear stand ready for instant use, with

big cylinders and columns burying them almost out of sight. Fragments of scrap iron are in every corner and seem to have landed everywhere, yet the globes of every electric light (and they are many) are intact. The electric light engine and dynamo stand close beside the main engine. The big low pressure receiver pipe wiped the dynamo off its base, but the engine went merrily on till it stopped for want of steam. There were eight relief valves on the cylinders and chests and six of them are unharmed. Probably those who saw the wreck will agree that it was the most interesting sight in the mechanical line ever seen around the lakes. It is understood that the owners want another engine, a duplicate of the one which has so suddenly gone out of existence. It will take between two and three months to get the steamer ready for sea again.

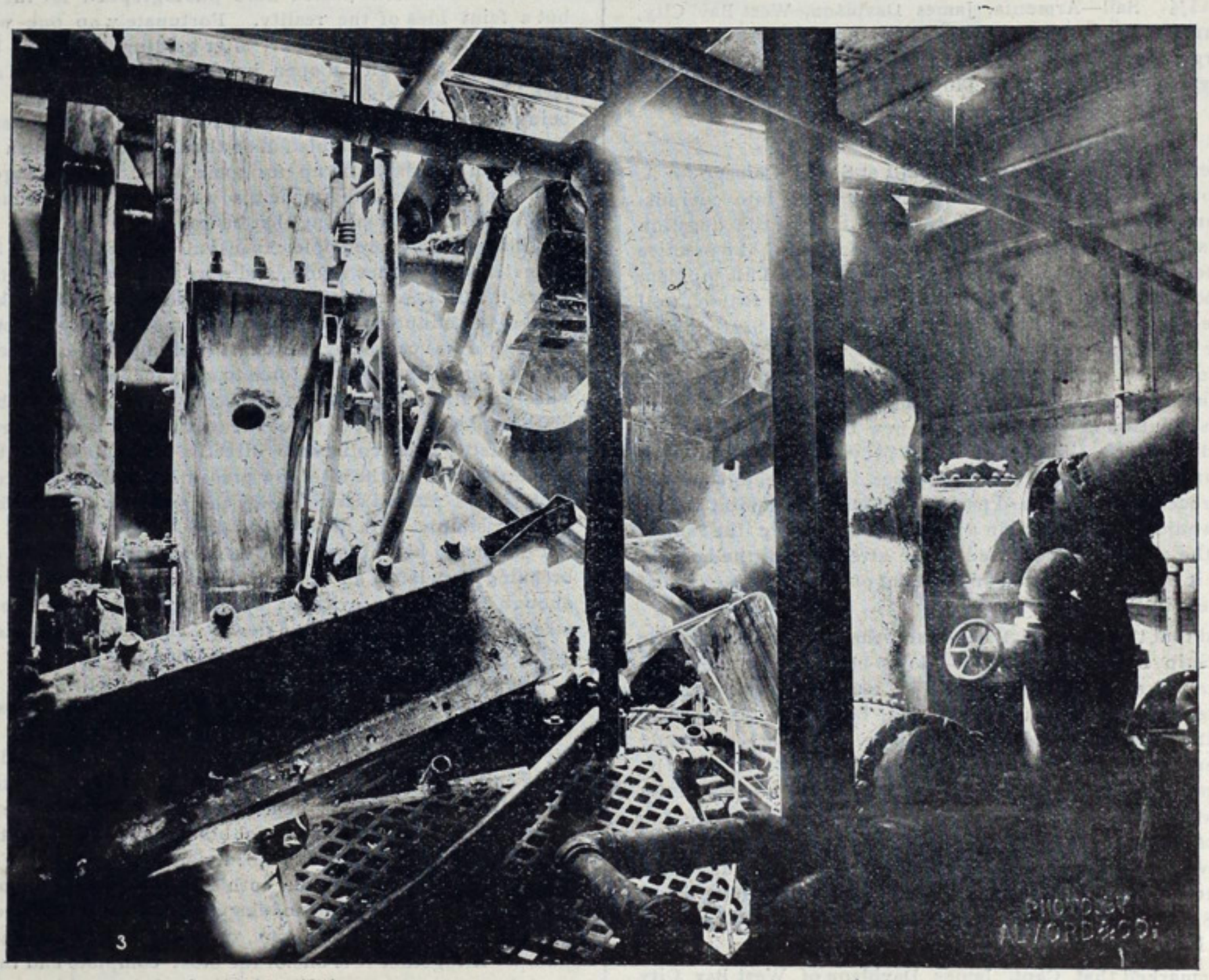
A Strong Freight Market.

Notwithstanding reports of a most discouraging nature from Pittsburg and other leading iron markets regarding finished material, the lake freight market has again assumed considerable strength, and there is every indication that ore rates will be back to about the opening figures, if the present demand for grain carriers holds out. Ten days ago there was fear among vessel owners of a general collapse in freights, on account of a suspension of the grain shipments from Duluth, which had upheld the entire freight market during the first month of the season, but a moderate corn movement out of Chicago has changed, for the present at least, the whole aspect of the situation. This change goes to show that so long as the grain, of which there are large quantities, continues to move, the freight market will be upheld, but on the other hand, it is also certain that in the absence of a grain movement there is not enough ore sold to maintain lake freights. Additional sales of ore in small quantities are being made from day to day, and a few season freight contracts have been made within the past week at 70 cents from Escanaba and at about the same rates from the head of the lakes that prevailed on the opening of navigation.

But there is very little season business offering, and such of it as is offered is readily taken up. The hope of vessel owners for profitable freights throughout the season now rests in grain and coal. If the grain movement continues fairly active during June and July, it is quite certain that an active ore business will be crowded into the latter part of the season. Notwithstanding the present depressed condition of the iron market, and the refusal of the Carnegie and other large Pittsburg interests to provide, as yet, for the ore which they must have during the coming year, most of the ore dealers are confident of large business later in the season.

To Lengthen the West-Bound Trip.

The Northern Steamship Co. has decided to lengthen the western trip on their passenger steamers this summer. Mr. A. A. Heard, general passenger agent of the line, says: "About the only complaints we have ever had about the trip up the lakes on our passenger ships relate to the short duration, which many consider a positive detriment. Our advance correspondence this year indicates that the feeling is growing, and we have therefore decided to lengthen our schedule on the west-bound trip four hours, giving passengers an all day ride across Lake Superior and changing our route so as to pass in full view of the beautiful Apostle islands. Passengers arriving at Duluth at 8:30 p. m. can leave for St. Paul or Minneapolis at 11:20 the same night, or, if they prefer, take our noon train from Duluth, which reaches St. Paul in time for dinner and makes connection at Elk River, Minn., with the Great Northern overland flyer. This is a positive benefit to tourist travel and one from which we expect large returns."



WRECK OF THE MERIDA'S ENGINES—PORT SIDE, LOWER HOLD.

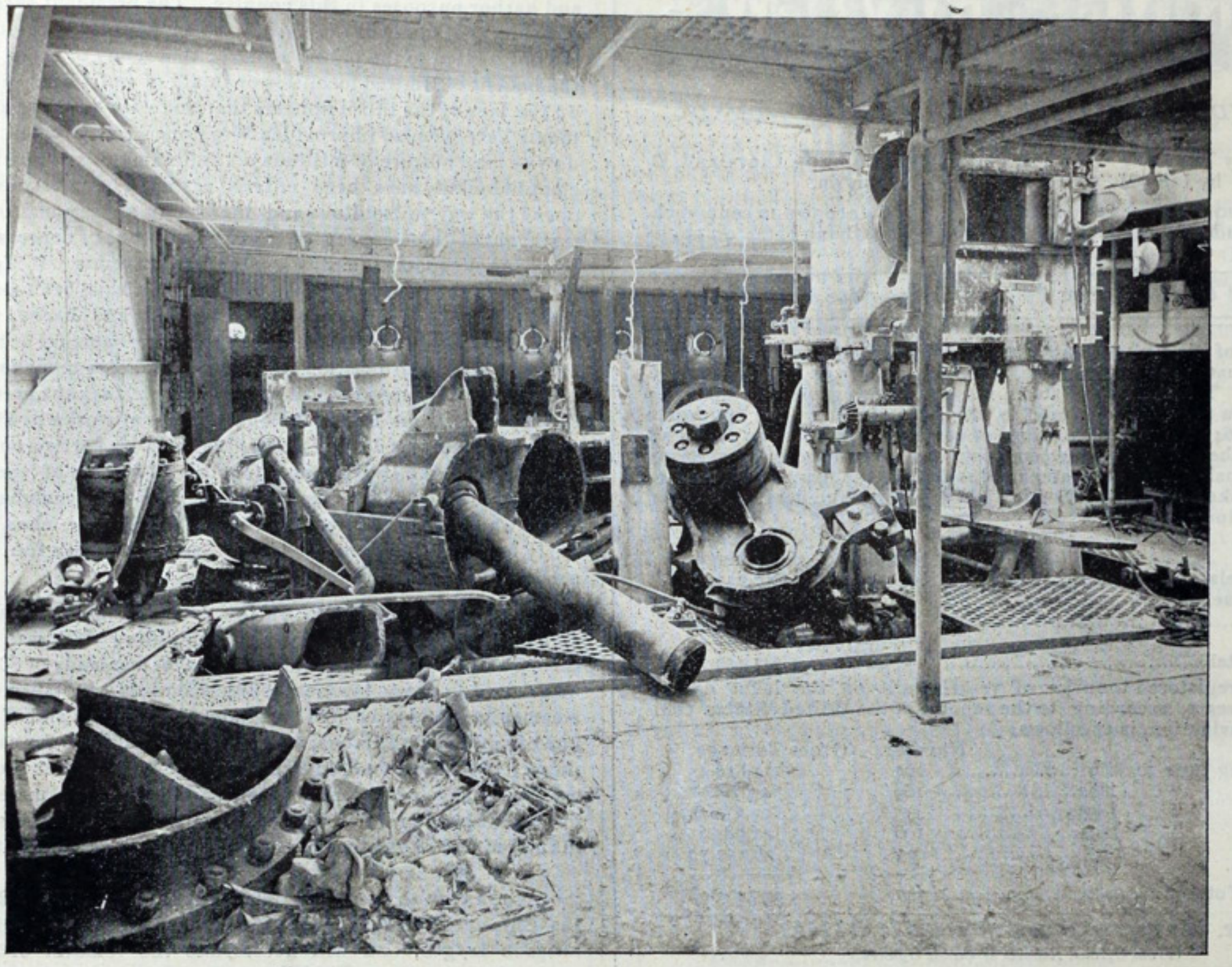
Contract for Another Steel Freight Steamer.

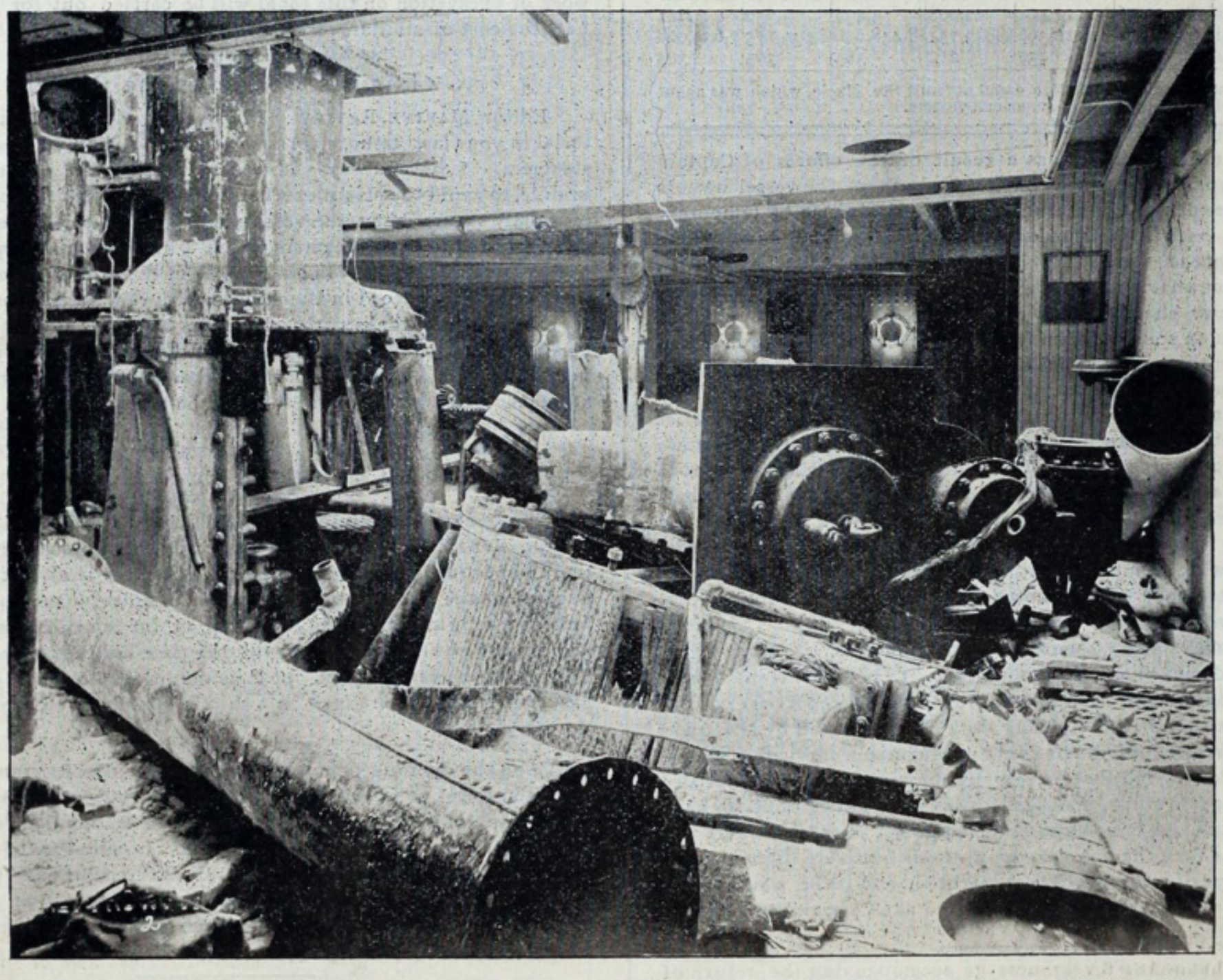
Although it has been understood for some time past that the Cleveland Ship Building Co. was to build another steel freight steamer for Capt. Thos. Wilson and others of Cleveland, the parties to the contract have up to this time kept the matter quiet. It is now fully understood, however, that the contract has been closed. The vessel is to be of the 400-foot class, a duplicate of the big steamer recently launched by the Cleveland company.

Few technical articles published recently have been copied more extensively than those of Mr. H. F. J. Porter, western representative of the Bethlehem Iron Co. The paper prepared by Mr. Porter for the recent meeting of engineers in St. Louis has been printed almost in full by several leading trade publications, and extracts from his article in the June number of Cassier's Magazine have been very numerous.

Henry C. Cranston, president of the American Ship Windlass Co., died at his home in Providence, R. I., on Wednesday last. He was one of the most prominent and successful business men of Providence.

Low rate, short limit tickets between Cleveland and Lorain have been placed on sale via the Nickel Plate road at $1.00 for the round trip. 77-7-31





PHOTOGRAPHS BY ALVORD & CO., DETROIT, MICH.

VIEWS OF WRECKED ENGINES, STEAMER MERIDA, SHOWING PORT AND STARBOARD SIDES OF MAIN DECK.

MARINE REVIEW

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, O by John M. Mulrooney and F. M. Barton.

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

Entered at Cleveland Post Office as Second-class Mail Matter.

The books of the United States treasury department on June 30, 1895, contained the names of 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1895, was 360 and their aggregate gross tonnage 643,260.40; the number of vessels of this class owned in all other parts of the country on the same date was 309 and their tonnage 652,598.72, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels	1,755	857,735.13
Sailing vessels	1,100	300,642.10
Unrigged	487	83,081.91
Total	3,342	1,241,459.14

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Gross Tonnage.
Year ending June 30, 1891	204	111,856.45
" " " 1892	169	45,968.98
" " " 1893	175	99,271.24
" " " 1894	106	41,984.61
" " " 1895	93	36,352.70
Total	747	335,433 98

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1895.*	1894.	1893.	1895.	1894.	1893.
No. vessel pass'ges	17,956	14,491	12,008	3,434	3,352	3,341
T'n'ge, net registd	16,806,781	13,110,366	9,849,754	8,448,246	8,039,175	7,659,068
Days of Navigat'n	231	234	219	365	365	365

* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about ½ per cent. of the whole, but largely in American vessels.

IT IS NOW quite certain that, as a result of the efforts of Captain McKay, Mr. Keep, Congressman Burton and others, the vessel owners will be under no expense this season for the maintainence of temporary lights that have been established at the Grosse point channel. The private light expense, borne by the Lake Carriers Association, will, however, be somewhat greater this season than it was in 1895, on account of other new channels that have required lights, buoys, etc. It was expected that an appropriation from the present congress would provide gas buoys for these points, but the light-house board is understood to have actually made a report against these buoys for the rivers. This change of opinion is said to be prompted by reports from the district inspectors, who object to towing with their light-house tenders the scows upon which gas buoys are carried. This objection is certainly of a poor kind, and if the naval officers on the lakes are disposed to look upon their tenders as pleasure boats, too good to engage in the work for which they were constructed, it would seem that a question has been raised in this gas buoy matter, which should be brought to the attention of the secretary of the treasury. An appropriation for gas buoys, that would greatly reduce the expense of private lights on the lakes, would have been secured from congress if the light-house officials had not interfered; and yet it is not many years since the light-house board used to print in its annual report every year a recommendation that private lighting should be abolished by law, upon the ground that private individuals could not furnish a service sufficiently reliable and efficient, and that private lights were liable to fail at any time without notice to ships, and that it was very undesirable to have such a service established in important localities. Vessel owners are even more anxious than the board to do away with private lighting, but the channels in question have got to be lighted, and if the government does not do its plain duty in the matter, the Lake Carriers' Association has got to light them.

PRESIDENT CLEVELAND'S veto message accompanying the return of the river and harbor bill to congress is significant from one important standpoint. It shows conclusively, although he does not say it plainly, that he is entirely against the whole system of appropriations for river and harbor purposes in this country. The president says, in vetoing the measure, that many of the objects for which it appropriates public money are not related to the public welfare; that many of them are palpably for the benefit of limited localities or in aid of individual interests, and that on the face of the bill it appears that not a few of these alleged improvements have been so improvidently planned and prosecuted that after an unwise expenditure of millions of dollars new experiments for their accomplishment have been entered upon. The measure, he concludes, opens the way to insidious and increasing abuses, and is in itself so extravagant as to be especially unsuited to times of depressed business and resulting disappointment in government revenue. If Mr. Cleveland was discussing the constitutional questions that have been many times raised with reference to appropriations for river and harbor purposes, these statements would find favor with the small proportion of the people of the United States who question the right of congress to make such appropriations. But there are practically no new projects in the present bill. All of the appropriations are for the continuance of works to which the government has committed itself and which must be carried out. No bill has been more carefully prepared for the advantage of the whole country than the present bill. One thing is certain—the members from the lake states who have supported appropriations for the lakes can conscientiously feel that there are no "jobs" connected with the projects in this section of the country.

AS SHOWING the desire of the Japanese government to encourage ship building in that country, a ship building bill was recently passed through both houses there providing that a subsidy of $6.50 per ton shall be granted to every Japanese subject building in Japan an iron or steel steamship of and over 700 but under 1,000 tons, and of $11 per ton for one of and over 1,000 tons, with an additional $2.75 for each unit of horse power. Both hull and engines must be built under the supervision of the department of communications, and no foreign material is to be employed unless specified by that department. The measure is to come into force in October next, and to continue in force for fifteen years.

ACCORDING to present estimates, it will cost $27,303,216 to complete the Chicago drainage canal, which, when finished, will be thirty-five miles in length, and will necessitate the removal of 39,972,762 cubic yards of material. In the rock section of the canal, which is 160 feet wide and 35 feet deep, 12,071,668 cubic yards of material will be channeled, drilled, and blasted out of solid rock. It is estimated that the work of excavation on this canal will be carried out for less than one-half the cost of similar work on the Manchester canal.

Engines Nearer to the Center.

Editor MARINE REVIEW: I have read with some interest the editorial in your last issue, referring to the position of machinery in lake steamers. I have always advocated placing the engines nearer the middle, to avoid the strain exerted upon the vessel's structure, which is especially severe when the vessel is light. This has been abundantly demonstrated in tank steamers which I have had many opportunities to observe at this port. Of late a number of these tank steamers have had their machinery placed in the middle, with very satisfactory results.

Not only will the structural strains be reduced with the machinery located centrally, but the superstructures, which usually surround the machinery, could easily be so arranged as to give considerable additional strength at that place, where it would be most useful.

JOHN HAUG,
Consulting Engineer and Naval Architect,
Philadelphia, May 30, 1896.

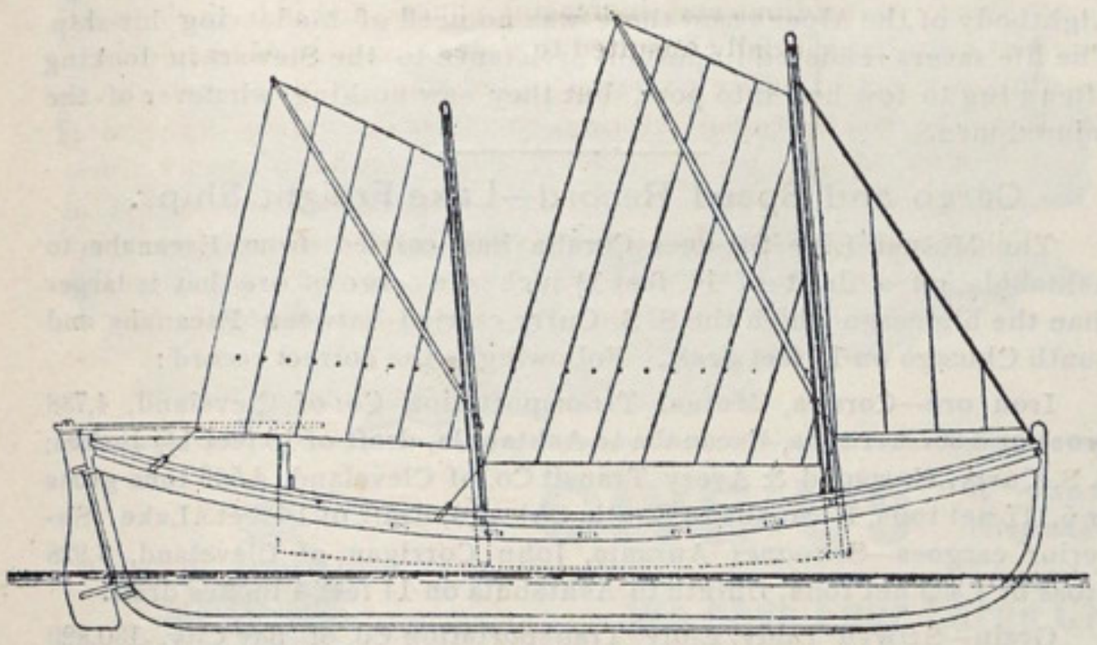
The steamer Plankinton reached Buffalo Saturday at 12:30 p. m. with a cargo of 80,000 bushels of wheat, which she unloaded immediately at the Connecting Terminal elevator. She then loaded at the Delaware, Lackawanna & Western trestle upwards of 2,200 tons of coal, took on her fuel from a lighter and left port at 9 p. m. for South Chicago. From the lake in and out to the lake again her time did not exceed nine hours. This about makes a record, for it is doubtful if quite as good despatch has ever before been given to a ship in Buffalo or at any other port in the world.

Upon the opening of navigation this year, the REVIEW published, in pamphlet form, a full list of captains and engineers of lake vessels. This pamphlet has met with a very large sale among dock managers, ship chandlers and supply houses of all kinds. It contains the names of hundreds of captains and engineers, as well as the names and post office addresses of all the leading corporations and firms that control vessel property. These small books are offered for sale by the REVIEW and will be sent to any address upon receipt of $1.

Round trip excursion tickets between Cleveland Lorain may be secured via. the Nickel Plate road at $1.00. 79 July 31

New Type of Life Boat.

A new type of life boat, illustrated herewith, is being introduced in the United States life saving service. Twelve of the vessels, for service on the lakes and the southern Pacific coast, were recently completed, and bids have been called for on twelve more for the New England coast. The boats for the New England coast will be 34 feet over all, 8 feet extreme breadth and 3 feet 6 inches depth. All the work and material is to be of the very best description, and as much care will be taken in the



construction as though the life boats were to enter a challenge race for a prize cup. All the fastenings are to be of copper nails and gun metal bolts, no iron fastenings being permitted. The outside planking is to consist of two layers of ⅜ inch welt and clear Honduras mahogany, laid diagonally across each other throughout, at an angle of forty-five degrees with the keel amidships. The outside of the inner skin of the boat is to be evenly coated with white lead, and then 10-ounce canvas is to be laid on and fastened to the inner skin. The canvas is then to be painted before the outer skin is laid on. The upper part of the keel is to be of white oak, and underneath this will be placed a gun metal keel 3 inches deep. The floors are to be of hackmatack. There are to be two large air tight compartments fore and aft. All available space between these compartments and below the deck are to be filled with air cases made of copper, 16 ounces to the square foot. Each case is to be tested for ten minutes under water at 105 degrees Fahrenheit before being placed in position. The copper cases will be fitted with handles so that they can be moved at will. The centre board is to be of gun metal and the masts of spruce, 18 and 16 feet long respectively. The jib and two sprit sails are to be made of No. 6 mildew proof cotton canvas. When possible the sails will be used to assist the oarsmen.

Capt. Isaac T. Morris.

Capt. J. H. Andrews, now of Eden, Fla., but who sailed the schooner Nellie Redington and other lake vessels for a great number of years, sends the REVIEW a few notes about Capt. Isaac T. Morris, who died in Chicago recently. Capt. Andrews says:

"Capt. Morris was in his sixty-sixth year. Death resulted from a congestive chill. He was on the board of trade until 4 P. M. the day before his death. Beside being a veteran vessel man, Capt. Morris had been on the board of trade for thirty years. He began sailing in the early forties, in the old fashioned brigs, such as the Freeman, John Irwin, Caroline and others. His first charge was the schooner Seaman, in 1852. He brought out the schooner Twin Sister in 1854 and he also sailed the schooner Wm. H. Stevens. In 1858 he took the schooner Correspondent to Liverpool, with 9,000 bushels of wheat. This was the first cargo of wheat shipped from a lake port direct to Europe. Capt. Morris made the voyage to Liverpool and two round trips from Buffalo to Chicago in the same season. In 1859 and 1860 he sailed the Ethan Allen and afterward sailed the S. B. Pomeroy. He quit sailing in 1866."

Big Pleasure Craft Establishment.

The announcement from New York that the Gas Engine & Power Co. and Charles L. Seabury & Co. have consolidated may be taken to mean that the works at Morris Heights, New York, will be enlarged in a manner that will probably make it the finest establishment in the world for the construction of pleasure craft. The great popularity of the Gas Engine & Power Co's specialty, the naphtha launch, is to be combined with Charles L. Seabury & Co's reputation as builders of high-class steam yachts. The new concern will at once begin the erection of extensive additions to the Morris Heights plant, including several sets of ship's ways and probably a sectional dry dock. When the plant is completed it will be not only the largest of its kind in the world, but the most complete, embodying in all departments modern mechanical appliances for handling this class of business. The present production covers a wide field, embracing, as it does, steam yachts and launches, naphtha yachts and launches, electric boats of various types and sail craft. Under the new arrangement the product will include all kinds of pleasure craft from a row boat to a cup defender or an ocean-going steam yacht. There will be a special department for the construction of steel hulls, and doubtless ere long the building of topedo boats will be a feature. Utilizing their own modern and improved designs in steam engines, and the well-known Seabury water tube boilers, makes possible the furnishing of the entire machinery, as well as hull, cabin work, etc., thus facilitating in the highest degree the opportunities of the marine architect to devolve the best possible results in economy of space and high speed. For some time past, it has been the aim of the projectors of this new works to do everything pertaining to the building of a pleasure boat in one establishment, thus overcoming the disadvantages involved when one concern builds the hull, another the machinery, still another the electric plant, etc. The Morris Heights works is only seventeen minutes' ride from the Grand Central depot New York, but it has been decided to continue the down town office at No. 50 Broadway, established by Seabury & Co., and at this office models, plans, illustrations, etc., may be examined. An insurance and brokerage department is to be made a feature of the new concern. In this department policies will be looked after, boats bought and sold on a commission basis, and charters effected on the usual terms. In point of fact, it is the intention to establish an up-to-date yacht emporium.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes on May 30, 1896:

	Wheat, bushels.	Corn, bushels.
Chicago	14,571,000	4,377,000
Duluth	8,318,000	.....
Milwaukee	547,000	2,000
Detroit	140,000	14,000
Toledo	287,000	88,000
Buffalo	1,132,000	465,000
Total	24,995,000	4,946,000

As compared with a week ago, the above figures show at the several points named a decrease of 850,000 bushels of wheat and an increase of 1,005,000 bushels of corn.

Fuel Consumption of Lake Steamers.

Following is a simple formula for learning how much coal a modern lake steamer should burn per hour:

When the piston speed is 500 feet per minute (the usual speed of lake engines), multiply the area of the low pressure cylinder by .5; when the piston speed is 600 feet per minute, multiply by .6. Divide this product by 2, which will give approximately the economical horse power of the engine. As there are few lake engines that develop power equal to their economical capacity, 10 per cent. should be deducted. Multiply this product, if the engines are triple expansion, by 2, and compound by 2.75, as 2 pounds and 2.75 pounds, respectively, represent the fuel consumption per horse power per hour in the best practice.

EXAMPLE:—Engines triple expansion, 24, 38, 61x42 inches.

61x61=3,721x.7854=2,922.
2,922x.5=1,461 economical horse power.
1,461—10%=1,315 developed horse power.
1,315x2=2,630 pounds coal burned per hour.

This same formula may be applied to compound engines, excepting, that as stated, 2.75 pounds should be used as the multiplier.

The chart of distances between lake ports, which was recently published by the hydrographic office, is the only reliable distance chart in existence. Distances are in statute miles, and the table includes 119 ports arranged alphabetically. This chart is especially serviceable in the offices of vessel owners where book records of miles run, and costs of various supplies per ton per mile are kept. It sells at 50 cents and may be had from the MARINE REVIEW, Perry-Payne building, Cleveland.

The tonnage of the new freight steamer E. W. Oglebay, built by F. Wheeler & Co. for D. C. Whitney of Detroit, is 3,666.19 tons gross and 3,019.01 net, while that of the Geo. N. Orr, built by the Chicago Ship Building Co. for C. W. Elphicke & Co. of Chicago, is 2,872.71 gross and 2,412.88 net.

Photographers' excursion to Chautauqua lake—On account of the annual convention of Photographers' Association of America, to be held at Celeron, N. Y., on Chautauqua lake, June 20th to 30th, the Nickel Plate road will sell excursion tickets at one fare for the round trip. 105-19

Around the Lakes.

The whaleback steamer Colby and three barges from the coast are now on the way up to the lakes.

Clemens Reiss, president of the C. Reiss Coal Co., died at his home in Sheboygan, Wis., Monday. Mr. Reiss had an extensive acquaintance among vessel men and shippers on the lakes.

Capt. Charles Wallace of Cleveland, who quit sailing some time ago to enter the employ of O. S. Richardson Fuel Co., was in Cleveland a few days ago in the interest of the big Chicago concern.

Shipments of hard coal out of Buffalo during May aggregated 284,281 net tons. For the season to June 1 the shipments foot up 330,989 tons, which is 71,201 tons more than was shipped up to June 1, 1895.

The steel steamer building at the works of the Union Dry Dock Co., Buffalo, for the Union Steamboat Co. is to be called Ramapo, after a station on the eastern division of the Erie railroad. This has been the plan of naming the Union liners for some time past.

An act authorizing the construction of a life saving station at Port Huron received the signature of the president, a few days ago, but it may a few years before funds are appropriated for the station, unless the matter is followed up by Michigan representatives in congress.

The gas buoy promised for Toledo is now in operation. It is painted black and shows a fixed white light. It is located in the place of the second-class can buoy, No. 1, about 20 feet southeasterly of the southeast bank of the straight channel from Lake Erie into Maumee bay.

John L. Evans has been appointed freight agent of the Cleveland & Buffalo Transit Co., to succeed Harry R. Rodgers, who has resigned to accept a position with the B. & O. Ry. Mr. Evans has been in the freight department of the C. & B. line for three years and is familiar with the work.

At Detroit on Sunday Capt. C. C. Blodgett, for forty years connected with the lake marine as sailor and owner, died from a cold contracted in Cleveland two weeks ago. He was at one time connected in business with Capt. E. B. Ward. He was born at Conneaut, O, sixty-eight years ago. Several years ago he sold his vessel property and devoted himself to the care of his large and improved property interests at Detroit.

The Globe Iron Works Co. is making repairs at the Ship Owners dock, Cleveland, on the steamer Choctaw, necessitated by her collision at the Sault with the new steel steamer L. C. Waldo. The hole in the Choctaw's side seemed big enough to row a yawl into it when the water was around her in the dock. Repairs will probably not be finished within two weeks. There are about twenty new plates and eight frames to be put in. The job will cost about $10,000.

One of the Buffalo papers says of Niagara river navigation: "The water began to come up as soon as navigation opened and it has continued to improve, so that it is now quite safe to run the river with a draft of 13 feet, unless there is an east wind, and all but the deep draft boats go when they like without especial risk. So far, a few tows have had to lighter here, but the reports of striking bottom do not come in, and if the season goes on as it began it will be as favorable as last season, which was the first for a long time when the Buffalo dry docks were not given a large amount of work from this source."

As had been expected, J. C. Gilchrist of Cleveland has purchased the wrecked schooners Moonlight and Kent from Capt. Jay Hursley, who released them from the beach near Marquette. The Moonlight is very little injured; apparently not any more than if she had been tied to a dock all winter. Mr. Gilchrist pays $13,500 for the two vessels, and bears the expense of towing them to Cleveland, as well as docking expense incurred since they have been in Cleveland. He certainly has two cheap vessels in this bargain, and Capt. Hursley can have little left on his wrecking job, as he paid $7,000 to the underwriters for the vessels while they were ashore. Considerable repair work will, of course, be necessary on the vessels before a class can be obtained for them, so as to make them insurable.

The Stewart Explosion.

Capt. W. E. Rice of the steamer Rhoda Stewart has been disturbed about erroneous reports that have gone out regarding the boiler explosion aboard his vessel on Lake Huron, recently. Everybody who knows Capt. Rice is aware of the care that attends everything in his charge, and it is certain that nobody deplores more than he does the loss of life that occurred aboard the Rhoda Stewart. The boiler was inspected by the government officials at Port Huron on May 13, just ten days previous to the accident. It was a steel fire-box boiler built in 1880 and allowed 90 pounds of steam, but not more than 85 pounds had been carried in it at any time of late. It has been overhauled several times and was specially overhauled before the opening of the present season of navigation. When in Cheboygan, before leaving on the trip on which the accident occurred, a stay bolt and two rivets were found to be leaking. The boiler was blown off and a boilermaker engaged to put in a new stay bolt and new rivets. He was instructed also to thoroughly examine everything about the boiler before the vessel left port and he did so. The Stewart was down to Presque Isle when the explosion occurred. The injured men were not taken off by life savers but by the passenger steamer City of Alpena, which came alongside the Stewart in answer to distress signals some time after the accident. Capt. Rice instructed the officers of the Alpena to spare no expense in making the injured men comfortable and in looking after them at Cheboygan where the Alpena was to leave them ashore. Capt. Rice also proposed going with the injured men, but Capt. Lightbody of the Alpena said there was no need of his leaving his ship. The life savers rendered important assistance to the Stewart in looking after a tug to tow her into port, but they saw nothing whatever of the injured men.

Cargo and Speed Record—Lake Freight Ships.

The Mutual Line Steamer Coralia has carried from Escanaba to Ashtabula, on a draft of 16 feet 1½ inches, a cargo of ore that is larger than the big cargo which the S. S. Curry carried between Escanaba and South Chicago on 18 feet draft. Following is the correct record:

Iron ore—Coralia, Mutual Ttransportation Co. of Cleveland, 4,738 gross or 5,307 net tons, Escanaba to Ashtabula, draft of 16 feet 1½ inches; S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,569 tons gross or 5,117 net tons, Escanaba to South Chicago, draft of 18 feet. Lake Superior cargoes—Schooner Aurania, John Corrigan of Cleveland, 3,928 gross or 4,399 net tons, Duluth to Ashtabula on 14 feet 4 inches draft.

Grain—Selwyn Eddy, Eddy Transportation Co. of Bay City, 130,820 bushels of wheat, Detroit to Buffalo; steel schooner Martha, Minnesota Steamship Co., 163,000 bushels of corn, South Chicago to Erie on 15 feet 4 inches; S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 246,673 bushels of oats, Chicago to Buffalo.

Coal—S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,535 net tons bituminous, Conneaut to Gladstone; Selwyn Eddy, Eddy Bros. of Bay City, Mich., 4,252 net tons anthracite, Buffalo to Milwaukee.

Speed—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 45 hours and 16 minutes, 16.4 miles an hour; Centurion, Hopkins Steamship Co. of St. Clair, Mich., Buffalo to Duluth, 997 miles, 67 hours and 50 minutes, 14.7 miles an hour.

Morison suspension furnaces, made by the Continental Iron Works, Brooklyn, N. Y., were put into the steamer W. H. Gratwick No. 1, recently, by the Howard & Roberts Boiler Works of Buffalo. This type of furnace has also been supplied recently to the Atlantic Works, East Boston, for the steamer Ethelred; Union Iron Works, San Francisco, for the steamer Queen; Hugh Ramsey, Perth Amboy, for United States lighthouse steamer Rose; E. Hodge & Co., East Boston, for steamer Saxon. They have also supplied the Harlan & Hollingsworth Co., Wilmington, with a plant for the Montauk and City of Chester.

The Nickel Plate road sells homeseekers' excursion tickets to the south, June 16, July 17 and 21, Aug. 4 and 18, Sept. 1 and 15, Oct. 6 and 20. For detailed information write any agent of the Nickel Plate road, or address B. F. Horner, general passenger agent, Cleveland, O. 108-30

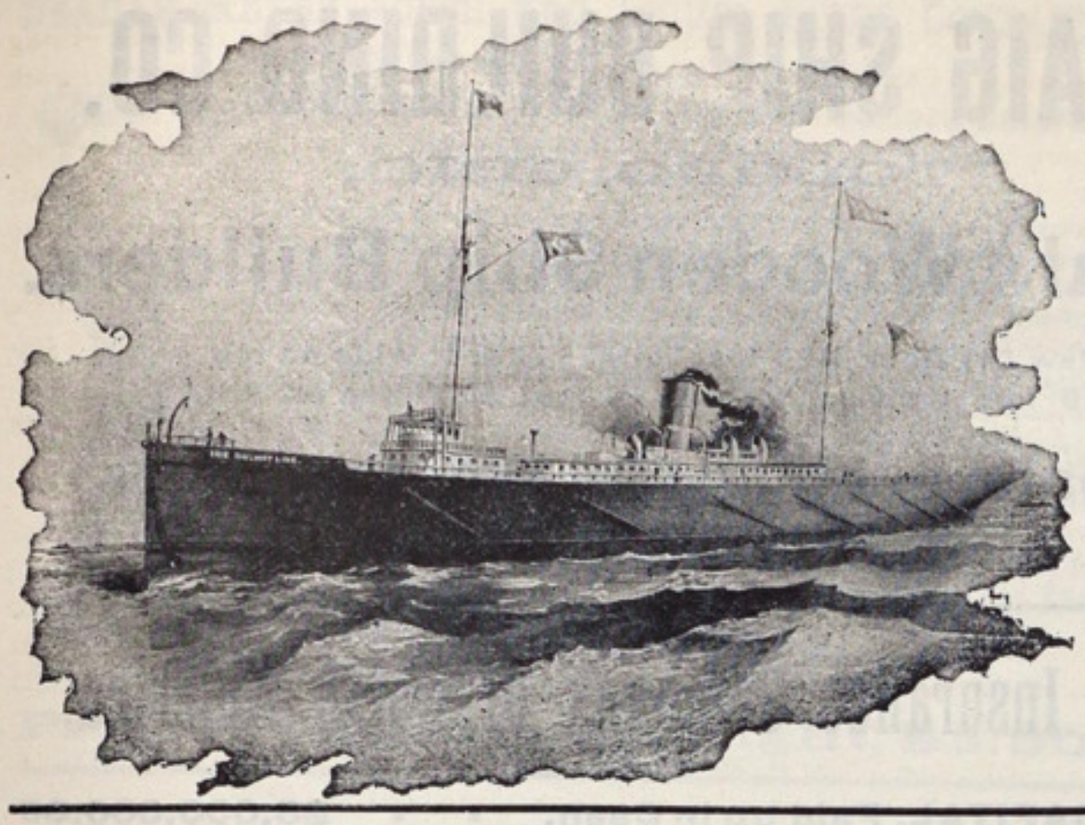
TREASURY DEPARTMENT, Office of General Superintendent, United States Life-Saving Service, Washington, D. C., May 28, 1896. Sealed proposals will be received at this office until 2 o'clock p. m. of Wednesday, the 24th day of June, 1896, for furnishing supplies required for use of the Life-Saving Service for the fiscal year ending June 30, 1897; the supplies to be delivered at such points in New York City, Grand Haven, Mich., and San Francisco, Cal., as may be required, and in the quantities named in the specifications. The supplies needed consist of Beds and Bedding; Blocks and Sheaves; Cordage; Crockery; Furniture; Hardware; Lamps, Lanterns, etc.; Lumber, Medicines, etc.; Paints, Oils, etc.; Ship Chandlery; Stoves, etc.; Tools and Miscellaneous articles; all of which are enumerated in the specifications attached to the form of bid, etc., which may be obtained upon application to this office, or to the Inspector of Life-Saving Stations, 24 State street, New York City; Superintendent Eleventh Life-Saving District, Grand Haven, Mich., and Superintendent Twelfth Life-Saving District, New Appraisers' Stores, San Francisco, Cal. Envelopes containing proposals should be addressed to the "General Superintendent U. S. Life-Saving Service, Washington, D. C.," and marked on the outside "Proposal for Annual Supplies." The right is reserved to reject any or all bids, and to waive defects, if deemed for the interests of the Goverment, S. I. KIMBALL, General Superintendent.

STEAM YACHT AMADIS....

Will be for charter to private parties for long or short cruises on the lakes or to the sea.

Address for particulars,

G. H. KIMBALL, 95 Adelbert St., Cleveland, O.



Rapid Fueling Docks,

DETROIT RIVER.

JAMES GRAHAM, Foot Twenty-first St., Detroit,

Below Routes of Passenger and Car Ferry Lines.

Pockets and Chutes arranged for different types of vessels.

BEST STEAM COAL.

Large Supplies and every effort to give dispatch, day and night. Wide stretch of river for tows, and plenty of water at dock at all times.

Keeping a sharp look-out for Shipman's Koal Dock.

GIVE US a chance to prove that we can coal your boats with quick dispatch, and with most satisfactory fuel.

We have Four Large CHUTES on our Docks at AMHERSTBURG, ONTARIO, 1,000 FEET RIVER FRONT and Day and Night Force.

OUR STOCK CONSISTS OF

"Keystone" Massillon, Youghiogheny, and Best Grades of Hocking Koals.

O. W. SHIPMAN, MAIN OFFICE, 90 Griswold St., Detroit, Mich.

THE CUDDY-MULLEN COAL CO., Cleveland.

DEALERS IN **Best Grades of Steam Coal.**

Special Attention Given to Steamboat Fueling.

SHIPPING DOCK with Car Dumping Machine and Full Equipment for Rapid Fueling within Eastern Arm of Breakwater, Cleveland.

Steam Lighters Carrying Drericks and Lagre Buckets in Operation Day and Night within Cleveland Harbor.

Pocket Dock now under construction on Sault River.

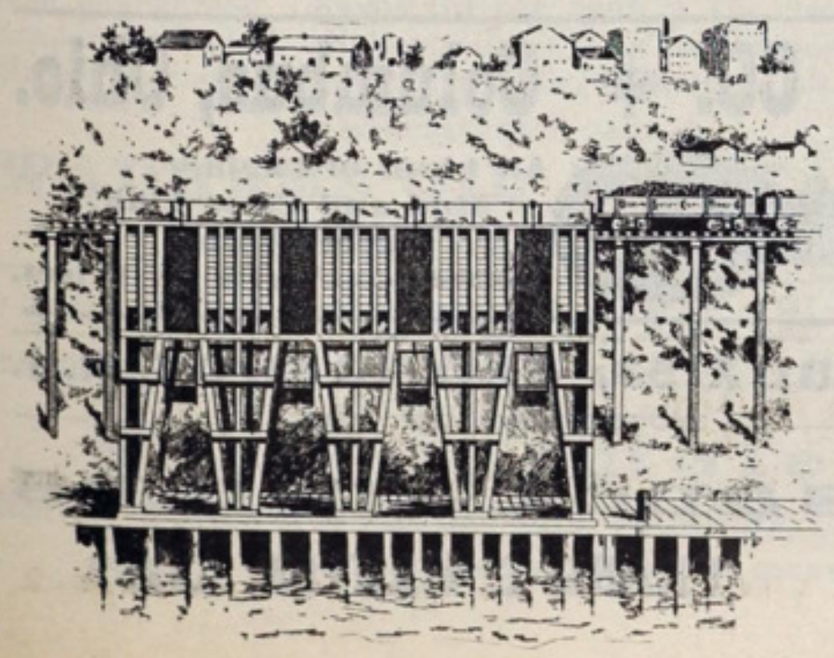
POCKET DOCK AT SANDWICH ON DETROIT RIVER, FORMERLY OWNED BY MULLEN & CATFIELD.

Main Offices: Perry-Payne Building, Cleveland, O. Telephone No. 8.

RIVER DOCK, West River Street. Telephone 1441.

FUEL DOCKS OF OSBORNE, SAEGER & CO.

Cuyahoga River, just above Superior St. Viaduct, Cleveland, O.



Best Youghiogheny Steam Coal Furnished Day or Night. No delay as Elevated Pockets are used.

COLUMBIA MFG. CO.

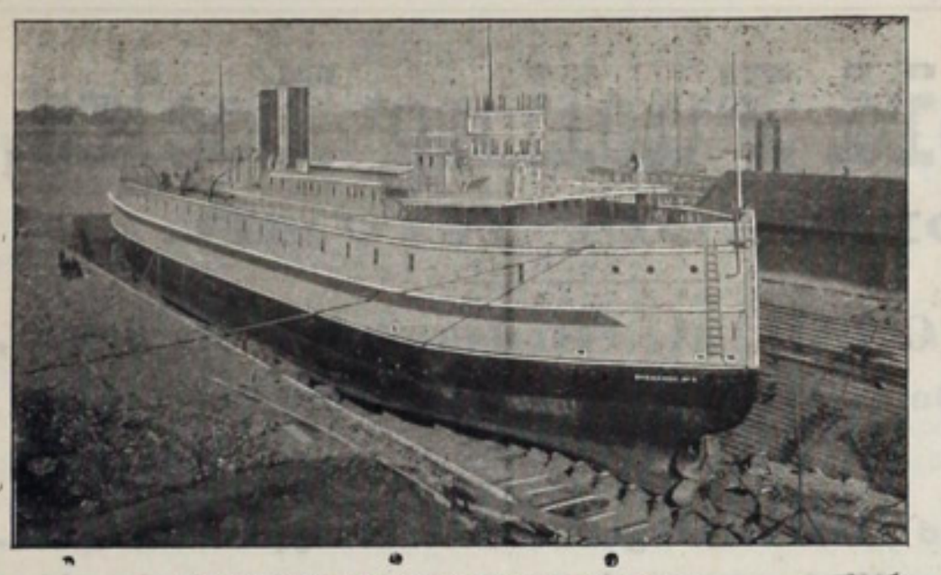
Manufacturers of

METAL POLISH, BUFFING COMPOSITIONS.

A great labor saver.
Especially adapted for Marine Engines.
1 lb. tin boxes, 45 cents; 5 lb. pails, $1.50.

94 Holmden Ave., CLEVELAND, O.

John Thompson, 123 River St., Agent, Cleveland, O.



Shenango No. 2, 300 feet long, 54 feet beam.

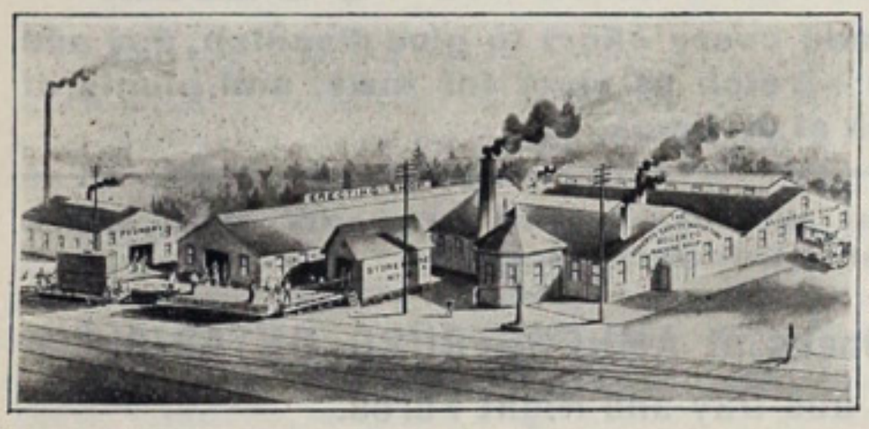
CRAIG SHIP BUILDING CO.

TOLEDO, OHIO,

Metal and Wooden Ship Builders.

New Dry Dock—450 feet long, 110 feet wide on top, 55 feet wide on bottom, 16 feet of Water on Sill.

Repairs to Metal and Wooden Ships A Specialty.



Chicago, Jan. 13, 1896.

THE ROBERTS BOILER CO.

Gentlemen: I cannot see but that the boiler in the "Mamie C" is just as good as it ever was, even if it is 17 years old. I had no complaint from it last summer.

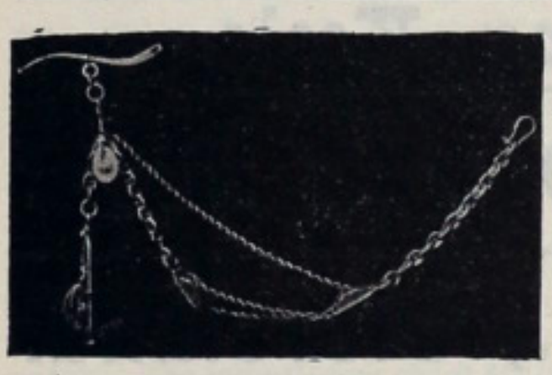
Yours truly,
A. E. CLARK.

THE ROBERTS BOILER is the Cheapest, Best and Lasts Longest.
Adapted for use in Yachts, Launches, and Vessels of all Kinds

Handsome Illustrated Circular sent free on application to

The Roberts Safety Water Tube Boiler Co.,

WORKS, RED BANK, N. J. 39 & 41 Cortlandt St., NEW YORK.



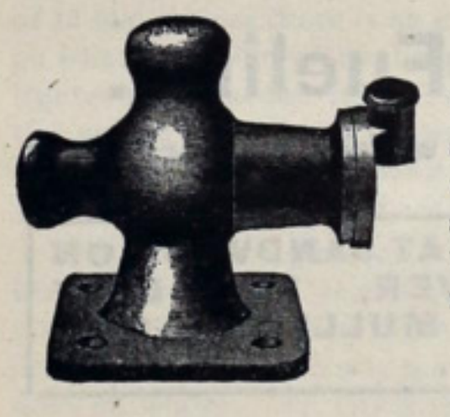
NAUTICAL WATCH CHAIN.

Solid Gold. Ship-shape in every detail.
Send for Descriptive Circular.

MORGAN A. ROBERTSON,

26 John Street, NEW YORK.

Enos Combined Bitt, Winch and Sheet Holder.



Patented in the United States, England and Canada.

Takes the place of wooden or iron bitts and forms a Combination Bitt and Winch. Takes up less room than the ordinary bitt. Can be used to great advantage as a Windlass or Sheet Holder on Yachts. An examination will convince you of the many uses to which it can be put.

Carried in stock by Ship Chandlers everywhere.

THE ENOS SHEET HOLDER CO.
Manufacturers and Proprietors, PEABODY, MASS.

JOHN HAUG, Consulting Engineer and Naval Architect.

Ship and Engineer Surveyor Lloyds Register, London.
Plans, Specifications and Superintendence of Ships and their Machinery.
Specialties—Bulk Oil Vessels High Speed Yacht Engines, etc.

206 Walnut Place, Philadelphia.

INCORPORATED 1794.

Insurance Company of North America.

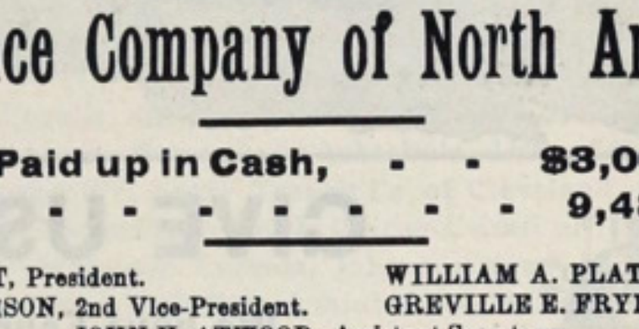
CAPITAL, Paid up in Cash, - - $3,000,000.00
ASSETS, . - - - - - - - - 9,487,673.53

CHARLES PLATT, President. WILLIAM A. PLATT, Vice-President,
EUGENE L. ELLISON, 2nd Vice-President. GREVILLE E. FRYER, Sec'y. & Treas.
JOHN H. ATWOOD, Assistant Secretary.

Lake Marine Department. GEORGE L. McCURDY, Manager. CHICAGO, ILLS.

Gas Engine & Power Co.

MORRIS HEIGHTS, NEW YORK CITY.



SOLE MANUFACTURERS OF

The Only Naphtha Launch.

ALSO BUILDERS OF

High Class Steam Yachts and Electric Launches.

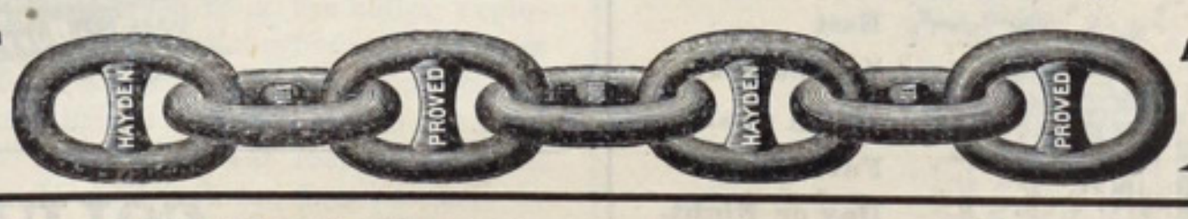
Send 10 cent stamp for Catalogue.

For Sale Cheap—Several tugs with engines all the way from 10x12 to 20x20 and all in good repair. For full particulars address:

INMAN TUG LINE,
B. B. INMAN, Manager, Duluth, Minn.

Chain Department ✻ P. HAYDEN S. H. CO. ✻ Columbus, Ohio.

Our Chain in use on the Largest Steamers on the Lakes:
The Zenith City, Victory, North West and North Land, and many others.



All kinds of Chain—
Stud and Close Link,
Cable Chains.
Write for Prices.

AMERICAN SHIP WINDLASS CO. P. O. BOX 53, PROVIDENCE, R. I.

BUILDERS OF THE

"Providence" Windlasses and Capstans

350 STYLES AND SIZES.
OVER 5000 IN USE.

SEND FOR CATALOGUE.

FRANK S. MANTON, AGENT.

GRAHAM-MEYER TORCH and LIQUID LIGHT COMPANY

89 Fulton St., Boston, Mass. MANUFACTURERS OF

Torches and Liquids for Lights of Various Colors,

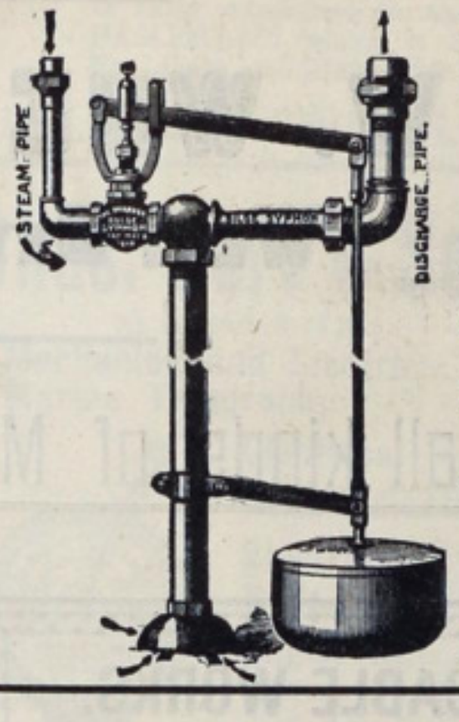
For Signal Lights and Illuminations of all kinds.
Blue Flash Lights a Specialy.

We call the attention of masters of vessels to the efficiency of our patented flare-up or flash light torch. It can be used with kerosene or spirits of turpentine. Its superiority over all other kinds of torches is that it is indestructible. Being filled with asbestos, it will last for years, and is ready for use at any moment. It gives a white flame three to five feet high, burns less liquid than any ordinary torch of the samc size or larger. The combustion is so perfect that very little smoke is made, and the flame is therefore much brighter. At night you can wigwag with this torch. Rain or spray will not extinguish it, and the stronger the wind the better it burns. We have also a **Blue, Green and Red Burning Liquid,** to make any code of signals required. Yachtsmen will find this of immense value for signaling.

Lake Agents: { The Upson-Walton Co., Cleveland, O.
{ H. Channon Co., Chicago, Ill.

Price of Flare-up Light, $3.50

THE BRAENDER AUTOMATIC BILGE SYPHON,



Always on Watch

"SHIP AHOY."

It never tires, or goes to sleep, and is reliable at all times.

It is the best, cheapest and surest way of keeping your vessel dry.

They are indorsed by leading Engineers throughout the country.

They commend themselves wherever placed.

A dry bottom in ship's holds gains speed, which is equal to money.

By giving it a trial, it will speak for itself. Write for circular,

PHILIP BRAENDER,
261 West 118th Street, • NEW YORK.

THE BABCOCK & WILCOX CO.

FORGED STEEL WATER-TUBE MARINE BOILER,

29 CORTLANDT ST., NEW YORK.

BOILERS SOLD TO STEAMERS

NERO,	ALGERIE,	ELEANOR,	REVERIE,	TROPHY,	SCOTTISH HERO,
TURRET CROWN,	HERO,	TURRETT CAPE,	SENECA,	PRESIDENT,	ZENITH CITY.

Under construction :—For Plant Line Steamship, building by the Newport News Shipbuilding and Dry Dock Co., eight (8) boilers with 20,300 sq. ft. heating surface and 460 sq. ft. grate surface, and pressure 200 lbs. per sq. in.; also boilers for new steamer building by the Cleveland Ship Building Co. for the Zenith Transit Co. (second order) and large tug for Duluth & Iron Range Railroad.

C. S. Richardson Fueling Co.

FUELING DOCKS:
NORTH PIER
18TH STREET BRIDGE,
ILLINOIS CENTRAL SLIP "C."

STORAGE DOCKS FOR ANTHRACITE:
KINGSBURY ST. BETWEEN INDIANA & ERIE STS.
ELSTON AVE. DIVISION ST. BRIDGE, (NORTH BRANCH.)
NORTH AVE. BRIDGE.
DIVISION ST. BRIDGE, (OGDEN CANAL.)
SOUTH HALSTED ST. BRIDGE.

COAL

OFFICE,
225 DEARBORN ST.
CHICAGO.

PRICES REDUCED.

THE O'CONNELL GREASER OR GREASE CUP COMPLETE FOR $20.00.

In use by many of the largest steamers on the lakes; a **positive feed guaranteed. Saves 50 per cent** in the cost of lubrication compared with Oil. Nothing like it for wristpins and crossheads on Marine Engines. Send for our catalogue testimonials.

MANUFACTURED ONLY BY

WADHAMS OIL & GREASE CO.
MILWAUKEE, WIS.

P. M. CHURCH & CO.,

SAVINGS BANK BLOCK, SAULT STE. MARIE, MICH

LEADING DEALERS IN

Ship Chandlery,

Marine Hardware, Paints, Oils, Packings, Cordage, Etc.

FIRST-CLASS COPPERSMITH AND TINSHOP IN CONNECTION.

THE WILLIAMS & RODGERS CO.

SUPERIOR and SENECA STREETS.

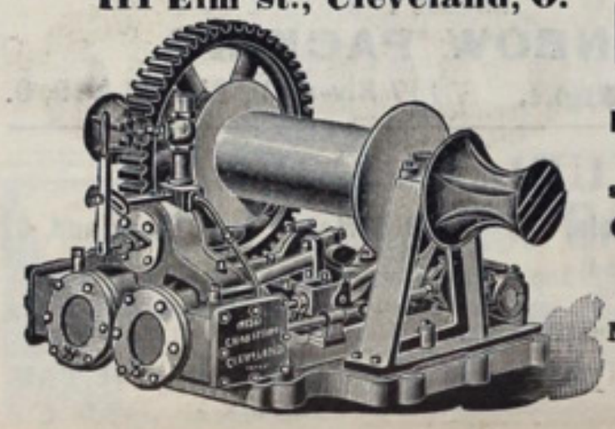
BOAT SUPPLIES

We make special rates to vessel owners on Dry Goods, Bedding, Floor Coverings, Furniture, Kitchen Utensils, etc.

THE WILLIAMS & RODGERS CO., CLEVELAND, O.

The Chase Machine Co.

111 Elm St., Cleveland, O.



MACHINISTS and ENGINEERS

MANUFACTURERS OF
Land and Marine Engines and Steam Pumps,

SOLE OWNERS AND MANUFCTURERS OF
Chase Fog Whistle Machine.
Over 150 in use on the best class of Lake Steamers.
Special Attention given to
MARINE REPAIR WORK.
Engineers' Supplies.
Asbestos Pipe and Boiler Covering.
TELEPHONE 994.

F. W. WHEELER, President. E. T. CARRINGTON, Vice-President. C. W. STIVER, Secy. and Treas.

F. W. WHEELER & CO.,

West Bay City, Mich.

Builders of all kinds of METAL AND WOODEN SHIPS.

AMERICAN CHAIN CABLE WORKS.

ESTABLISHED 1865.

Cable, Dredge, Quarry, Shipping, Crane and Rafting

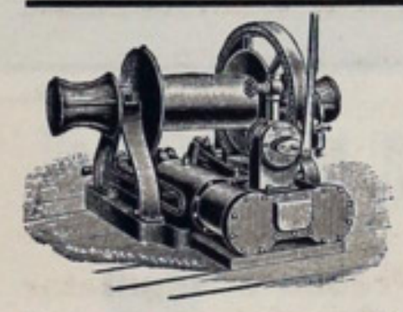
CHAINS.

Our Dredge and Crane Chains are made of Iron Rolled Specially for that purpose in three qualities, "Burden's," "H. B. & I." iron, and "Burden's Best Best" iron.

THE J. B. CARR COMPANY, TROY, NEW YORK.

THOS. DREIN & SON, TATNALL AND RAILROAD STS., WILMINGTON, DEL.

Builders of Metallic Life Boats and Rafts, Yachts and Pleasure Boats. Life Preservers. Outfit for Lake Steamers a Specialty.



DOCK and DECK HOISTS

ALL KINDS OF

Machinery & Friction Hoists.

SEND FOR PRICES AND CIRCULARS.

JACKSON & CHURCH, SAGINAW, MICH.

THE "CINCINNATI"

AUTOMATIC

STEAM STEERING GEAR

A Simple, Powerful Machine. Noiseless and Sure.

SEND FOR CIRCULAR.

FRONTIER IRON WORKS, DETROIT, MICH.

HOWARD H. BAKER & CO.

Ship Chandlers and Sail Makers,

18 to 26 Terrace. BUFFALO, N.Y.

H. E. STEVENS. TOM MEAD. LEW PRESLEY

BUCKEYE STEAM FITTING CO.

Steam Fitters, Engineers Supplies,

Phone 4058. AGENTS FOR

RAINBOW PACKING.

Open Day and Night. 117 River St., CLEVELAND, O.

CAPT. SAMUEL W. GOULD,

Ex-Ass't Inspector of Steam Vessels, 265 Marcy Ave, Cleveland, O.

Gives instructions in Navigation and prepares Candidates for the Examinations, for Master and Pilots Licenses, before the Local Steamboat Inspectors.

Also Instructions given in the Safety Valve and other Problems required by Candidates for Engineers License.

TERMS REASONABLE. TAKE WADE PARK OR PAYNE AVE CAR.

B. B. INMAN, Manager. H. G. INMAN, Sec'y and Treas.

Inman Tug Line.

Office on N. P. Dock, Open Day and Night.

TELEPHONE 146 DULUTH, MINN.

Finest outfit at the head of the lakes for log towing.

TUGS.

M. D. Carrington	L. L. Lyon	P. B. Campbell
E. T. Carrington	F. H. Stanwood	Pathfinder
J. L. Williams	Buffalo	A. C. Adams
Bob Anderson	Record	Mystic
Joe D. Dudley	Effie L.	Lida
W. B. Castle	Edward Fiske	

Tugs, Hawsers, Steam Pumps, Lighters and Divers Furnished on Short Notice.

Also owners of Steamer Belle Cross and Schooner Clement and Chicago Board of Trade. Three 12-inch Am. Fire Engine Company's Wrecking Pumps, and one 12-inch Worthington Pump.

H. CHANNON COMPANY

Ship Chandlers and Sail Makers.

AGENTS FOR

RYLANDS BROS.

MANUFACTURERS OF

ENGLISH GALVANIZED STEEL HAWSERS.

24-26 Market Street, CHICAGO, ILL.

The Martin-Barriss Co.

IMPORTERS AND MANUFACTURERS OF

Mahogany, White Mahogany,

AND ALL NATIVE CABINET WOODS.

HIGH GRADES OF KILN DRIED WOODS FOR CABIN WORK AND INSIDE TRIM.

White Oak Timbers and Plank

CONSTANTLY ON HAND AND SAWED TO ORDER ON SHORT NOTICE.

654 Seneca Street, Cleveland, Ohio.

DETROIT SHEET METAL AND BRASS WORKS

No. 64-66-68-70-72 ORLEANS STREET, DETROIT, MICH.

Jobbers of..... Pipe, Valves, Fittings. Packing, Oil and Engineers Suplies.

Contractors for High Class Steam Fitting, Steam Heating, Plumbing, Copper Work, and all Classes of Sheet Metal Work.

Manufacturers of Clark's Patent Metallic Life Raft, Side Lights, Marine Hardware, Hurricane, Cabin and Platform Lamps, Trip Gongs, etc.

Agents for..... Laidlaw - Dunn - Gordon Steam Pumps, Warren Webster's Specialties, and Buffalo Forge Co.'s Fans, Engines and Heaters.

Engineers can be waited on promptly day or night.

DIXON'S Graphite Pipe Joint Compound

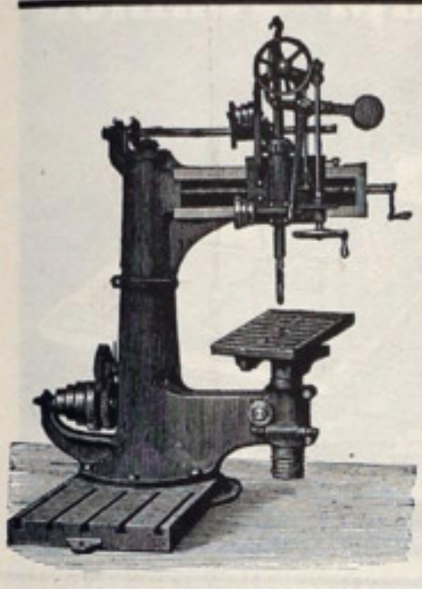
Enables you to MAKE A TIGHTER JOINT than you can possibly make with red lead. You can do it easier, and parts can be separated at any time without breaking anything. Send for sample and circular.

JOS. DIXON CRUCIBLE CO., JERSEY CITY, N. J.

DIXON'S Lubricating Graphite

Is fully explained in an INTERESTING AND INSTRUCTIVE PAMPHLET which is FREE to all interested. It will pay all Engineers and Machinists to SEND FOR IT.

JOS. DIXON CRUCIBLE CO., JERSEY CITY, N. J.



Bement, Miles & Company,

PHILADELPHIA, PA.

MANUFACTURERS OF

Metal Working Machine Tools

For Ship Yards, Railroad Shops, Locomotive and Car Builders, Machine Shops, Rolling Mills, Steam Forges, Boiler Shops, Bridge Works, etc., etc.

Steam Hammers, Steam and Hydraulic Riveting Machines.

New York Office: Taylor Bldg. No. 39 Cortlandt St.
Chicago Office: 1534 Marquette Building.

Chas. Corv & Son

Manufacturers of the

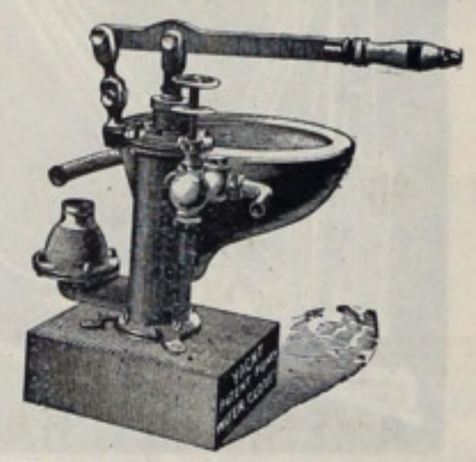
Mechanical and Electric Marine Telegraph,

Electrical Helm Indicators Electric Call Bells.

Engine Bells and Brass Work of all descriptions, Shrieking and Siren Whistles.

278 DIVISION ST.,
NEW YORK CITY.

Alfred B. Sands & Son



Yacht Plumbers.

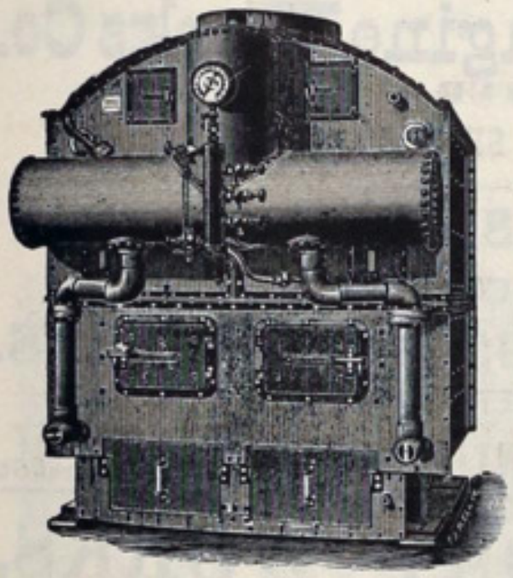
MANUFACTURES OF

YACHT PLUMBING SPECIALTIES.

Pump Water Closets, for above or below water line.

Folding Lavatories, Ventilators, Pumps, Deck Plates, Etc.

134 Beekman St., NEW YORK.



ALMY'S PATENT

SECTIONAL

Water • Tube • Boilers.

NOW USED IN

18 Passenger Boats from 70 to 160 feet long.
27 Steam Yachts from 50 to 160 feet long.
U. S. Torpedo Boat "Stiletto."
Numerous Small Launches and Stationary Boilers are giving most excellent results.

ALMY WATER-TUBE BOILER CO.,

No. 178-184 Allens Avenue, near Rhodes St.

PROVIDENCE, R. I.

NEVERSINK CORK JACKET AND LIFE BELT.

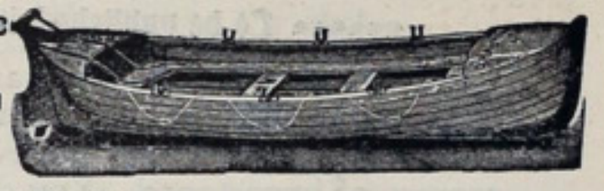
Warranted 24 lb. Buoyancy and full Weight of Cork, as required by U. S. Inspectors.
Consolidated Cork Life Preservers. Superior to all others. **Ring Buoys and Fenders.**

SAFEST, CHEAPEST. Approved and adopted by U. S. Board of Supervising Inspectors.

Also adopted by the principal Ocean, Lake and River Steamer Lines as the only Reliable Life Preserver. Vessels and the trade supplied. Send for catalogue.

Awarded four Medals by World's Columbian Exposition

Metallic and Wooden Life Boats.



Metallic Life Rafts, Marine Drags.

Manufacturer of Woolsey's Patent Life Buoy, which is the lightest, cheapest and most compact Life Raft known.

Send for Illustrated Catalogue.
Get our prices before buying elsewhere.

D. KAHNWEILER,
437 Pearl Street, NEW YORK CITY.

1880. 1896.

CHAS. H. POTTER & CO.,

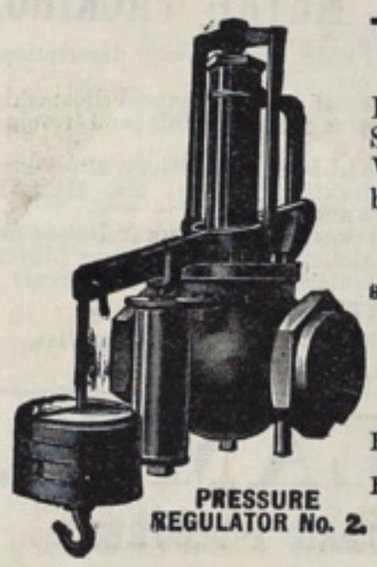
Investment Bankers,

Cleveland, O.

Dealers in

Lake Superior Iron Mining Stocks, Municipal, Water Works and Street Railway Company Bonds.

We buy and sell for cash all securities listed on the New York, Boston, Chicago, Philadelphia, Cincinnati and Pittsburg stock exchanges.



PRESSURE REGULATOR No. 2.

The "DAVIS" Pressure Regulator and Reducing Valve.

Is the simplest and best for reducing the pressure to Steam Steering Engines, Donkey Engines, Steam Winches and all places requiring a uniform pressure below that of boilers.

No diaphragms, spring or packing.

Cut shows scale weights. We can furnish lever and sliding ball weight if preferred.

MANUFACTURED BY

G. M. DAVIS & CO.

106 N. Clinton St., CHICAGO, ILL.

FOR SALE BY

R. E. Hills, Chicago. C. H. McCutcheon, Buffalo
Geo. Worthington Co., Cleveland.
P. M. Church, Sault Ste. Marie. Jas. Walker & Son, Detroit
Jas. Clements & Son, Bay City, Mich.
Cleveland Ship Building Co., Cleveland.
Chicago Ship uilding Co., Chicago.

Selling agents—The McIntosh-Huntington Co., Cleveland, O.; The Detroit Sheet Metal and Brass Works, Detroit, Mich.

TRY OUR

GRAPHITE PAINTS

For VESSELS, STACKS. DECKS, HULLS, ETC.

They have No Superior. They are Durable.

CLEVELAND IRON ORE PAINT CO.

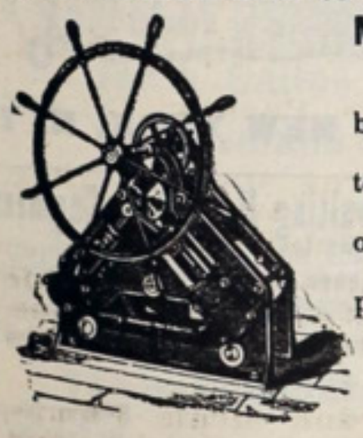
156 Merwin St., CLEVELAND, O.

Mention Marine Review.

OFFICE OF THE LIGHT-HOUSE ENGINEER, 7th and 8th Light-house Districts, New Orleans, La., May 27, 1896. Proposals will be received at this office until 12 o'clock, noon, on the 16th day of June, 1896, for furnishing a new boiler for the light-house tender Arbutus. Specifications, forms of proposal, and other information may be obtained on application to this office. The right is reserved to reject any or all bids and to waive any defects. JAMES B. QUINN, Major, Corps of Engineers, U. S. A., Light-House Engineer.

SHERIFFS STEAM STEERER.

MADE IN TWO SIZES.



Are easy to adjust and can be handled by any one.

The Steerer can be arranged to set in pilot house or aft.

No Steerer will be sold without a quadrant.

Steerer will be sold on approval.

Manufactured by

SHERIFFS MFG. CO.

126-130 Barclay Street, MILWAUKEE, WIS.

Paint your Vessels with **Superior Graphite Paint.**

NO BLISTERING, CRACKING OR SCALING.

Made especially for Stacks, Decks, Sides, Hulls and Water Compartments. Strictly anti-rust, and most durable and economical.

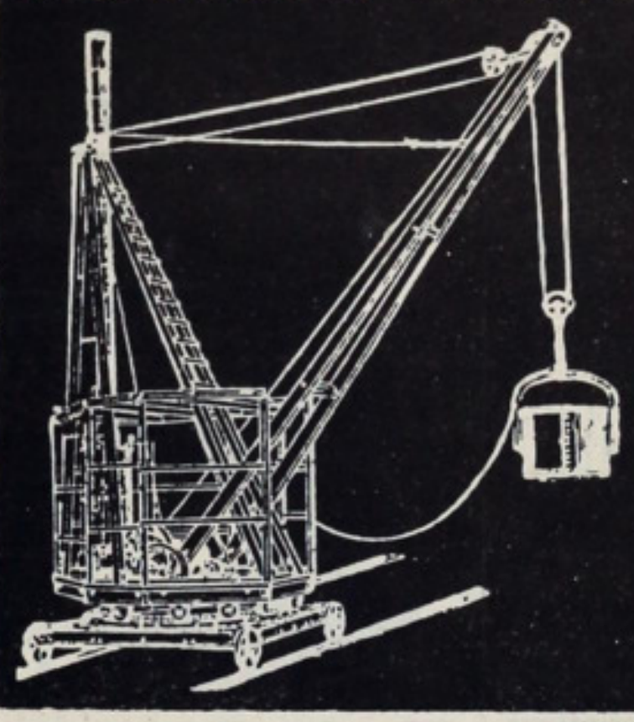
DETROIT GRAPHITE MFG. CO., 541 River St., Detroit, Mich.

"ROPER'S LAND AND MARINE ENGINES," BOUND IN MOROCCO WITH FLAP AND POCKET, WILL BE MAILED TO ANY ADDRESS FOR $3.50 SENT TO THE MARINE REVIEW, CLEVELAND, O.

McMYLER MANUFACTURING CO., 180 COLUMBUS STREET, CLEVELAND, O.

SOLE MAKERS OF THE

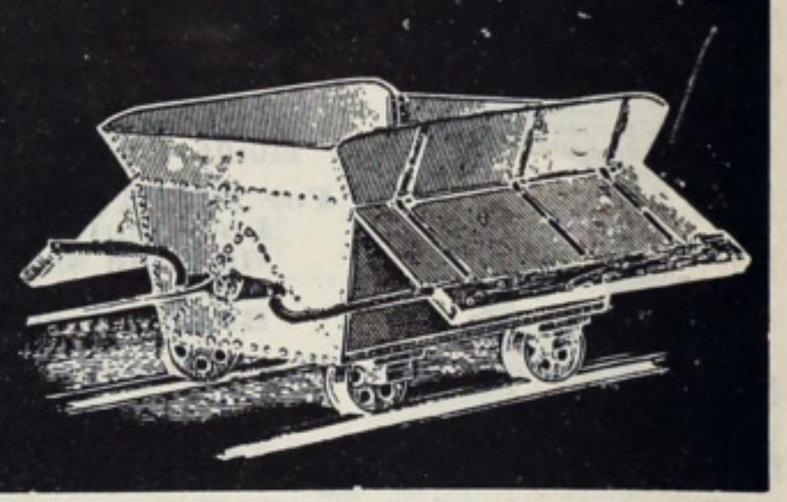
McMYLER PATENT REVOLVING STEAM DERRICK



FOR HANDLING COAL, ORE AND COARSE FREIGHT OF ANY DESCRIPTION.

This Derrick can Lift Load, Alter the Radius of Boom, Swing in Either Direction at Will of Operator, and can Propel Itself on Track any Desired Distance.

BUILT FOR ANY CAPACITY WANTED



BUILDERS OF
CONVEYORS, COAL BUCKETS, ORE BUCKETS AND DUMP CARS.

"IMPROVEMENT THE ORDER OF THE AGE."

IF YOU DESIRE TO LEARN

Respecting the merits of the THREE NEW MODELS, Nos. 2, 3 and 4, SMITH PREMIER TYPEWRITERS, drop us a line. They embody the Most Progressive Mechanical Principles, and are "up-to-date" in every respect.

The Smith-Premier Typewriter Co.

348 Superior Street, City Hall Building, CLEVELAND, OHIO.
Competent Operators Furnished. TELEPHONE 339.

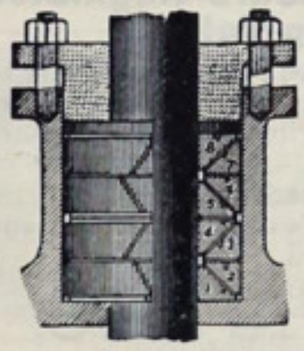
1896—Marine Review Year Book—1896

To be published in May, 1896.

THE most complete and handsomest Marine Directory ever published. Containing new features that will make it necessary to every lake marine business concern of importance. You cannot afford to miss being represented in its advertising columns. Write for prices of space.

Marine Review, 516 Perry-Payne Bldg., Cleveland, O.

KATZENSTEIN'S Self-Acting METAL PACKING,



For PISTON RODS, VALVE STEMS, etc., of every description, for Steam Engines, Pumps, etc., etc.

Adopted and in use by the principal Iron Works and Steamship Companies, within the last twelve years, in this and foreign countries.

FLEXIBLE TUBULAR METALLIC PACKING, for slip-joints on Steam Pipes, and for Hydraulic Pressure; also METAL GASKETS for all kinds of flanges and joints.

DOUBLE-ACTING BALANCED WATER-TIGHT BULKHEAD DOORS for Steamers. Also Agents for the McColl-Cumming PATENT LIQUID RUDDER BRAKE. For full particulars and reference, address:

L. KATZENSTEIN & CO.,
General Machinists, Brass Finishers, Engineers' Supplies,
357 West St., New York.

SHIP LAMPS.

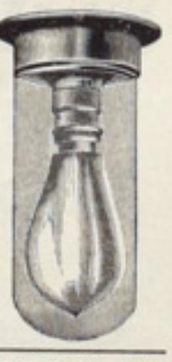
OIL AND ELECTRIC FIXTURERS

FOR

Steamships, Yachts, &c.

GREAT VARIETY OF DESIGNS.

Prices and Cuts on Application.



PAGE BROS. & CO.,

347 to 357 Cambridge St. Boston, Mass.

We claim the following merits for

JENKINS BROS.' VALVES.

1. Manufactured of the best Steam Metal. [Valves.
2. No regrinding, therefore not constantly wearing out the Seat of the
3. Contain JENKINS DISC, which is suitable for all Pressures of Steam, Oil, and Acids.
4. The Easiest Repaired, and all parts Interchangeable.
5. Every Valve tested before leaving the factory.
6. ALL GENUINE stamped with Trade Mark.

JENKINS BROS. New York, Philadelphia, Chicago, Boston.

The Bertram Engine Works Co.

(LIMITED.)

ENGINEERS AND SHIP BUILDERS.

MARINE ENGINES AND BOILERS.

STEEL AND COMPOSITE

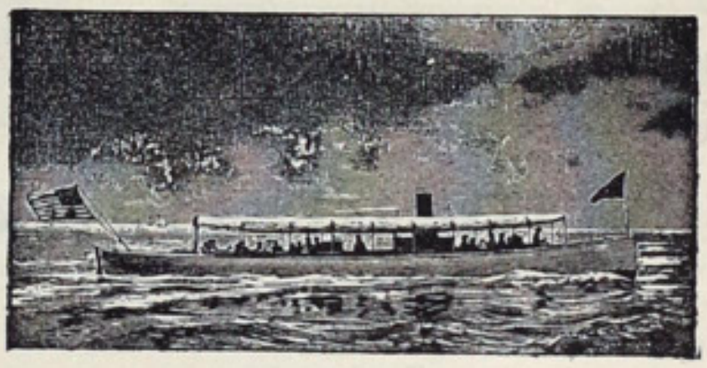
STEAMERS, TUGS and YACHTS.

ROBERTS AND MOSHER SAFETY WATER-TUBE BOILERS.

Office and Works: Niagara & Bathurst Sts., TORONTO, ONT., Ship Yard: Foot of Bathurst St.

DETROIT BOAT WORKS.

STEEL and WOODEN



YACHTS and LAUNCHES.

BUILDERS OF *ELECTRIC LAUNCHES*, DETROIT, MICH.

Any Class Wooden, Iron or Steel Boats up to 150 ft. in length.

YAWLS. METALLIC LIFE BOATS. LIFE RAFTS.

All kinds of Small Pleasure Boats.

The electric launches used on the lagoons at World's Fair were manufactured by this company.

Send for new illustrated Catalogue of electric launches.

For special prices on DEADLIGHTS, write

THE MARINE MANF'G AND SUPPLY CO.
158 SOUTH ST.
SHIP MACHINERY, YACHT FIXTURES
STEAMSHIP, ENGINEERS & CONTRACTORS
SUPPLIES, ANCHORS, CHAINS, OAKUM,
TOOLS, CORDAGE, WIRE ROPE, ETC

NEW YORK, N. Y.

MIERS CORYELL

21 E. 21st Street, NEW YORK.

Consulting Mechanical Engineer,

Plans, Specifications and Superintendence. Marine and Water Works Engines and Boilers.

JEFFERY'S MARINE GLUE

Can be obtained from the following well-known firms:

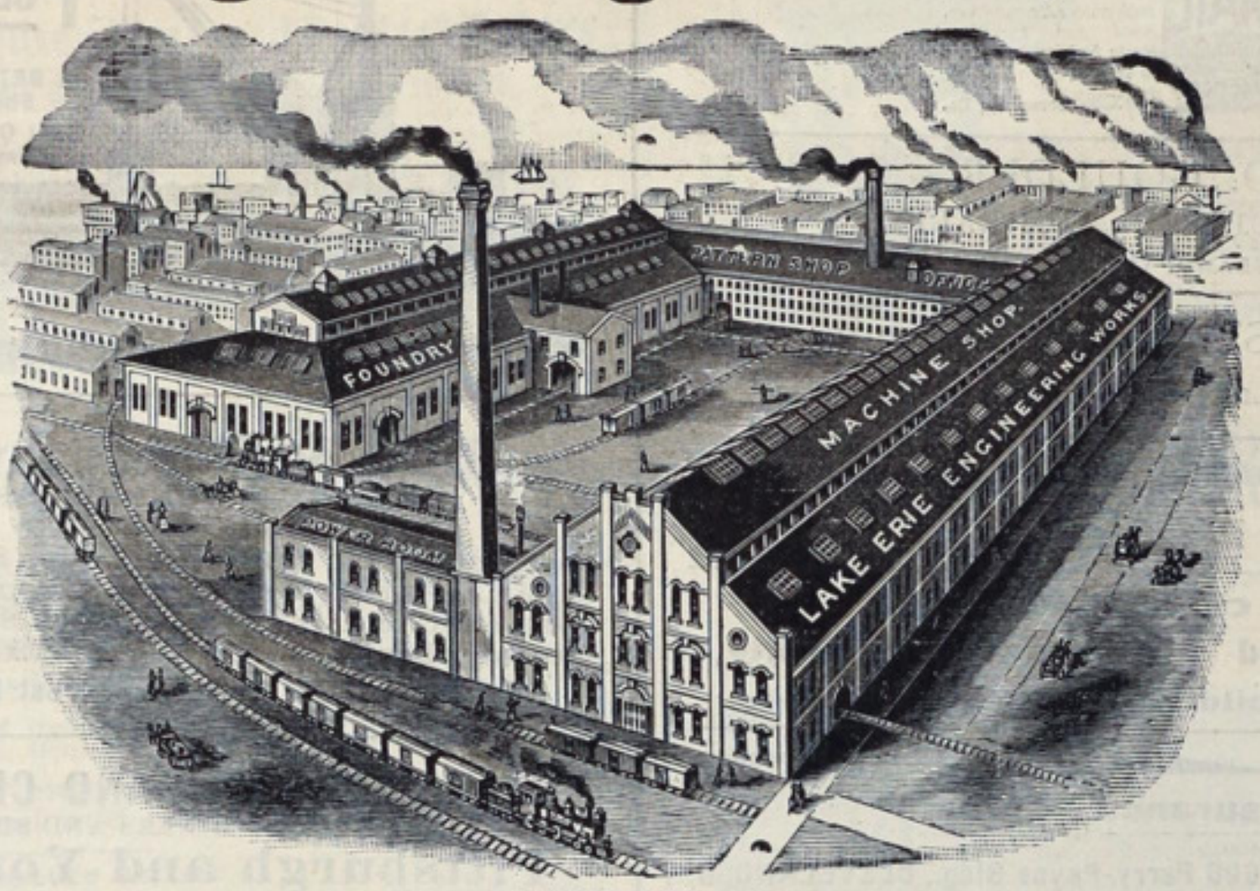
L. W. Ferdinand & Co.	Boston, Mass.
Howard H. Baker & Co.	Buffalo, N.Y.
Geo B. Carpenter & Co.	Chicago, Ills.
H. D. Edwards & Co.	Detroit, Mich.
Upson-Walton Co.	Cleveland, Ohio.
M. I. Wilcox Cordage & Supply Co.	Toledo, Ohio.

Send for Samples and Circulars.

Lake Erie Engineering Works, Buffalo, N. Y.

RICHARD HAMMOND, Pres't. JOHN COON, Sec'y and Treas.

Steam Engines, Compound, Triple and Quadruple Expansion Engines, From 250 to 10,000 Horse Power For Marine and Stationary Service.



Special Designs for Cable Railways and Electric Power Plants.

The Best Economy and Regulation Guaranteed.

THE BEST EQUIPPED PLANT IN AMERICA.

Nickel Plate Ahoy? Aye, Aye Sir!
The line to hail and the line to take
To reach your craft to fit her out,
Is the well-known, ship- hape Nickel Plate Route.
Chicago, Cleveland, Buffalo,
Or any port you want to go,
The shortest time and lowest rate
Are shipmates with the Nickel Plate.

A SUPERB DINING CAR SERVICE.

For particulars inquire of

A. W. JOHNSTON, Genl. Supt. or, **B. F. HORNER,** Genl. Pass. Agt.

CLEVELAND, O.

OIL BAGS for CALMING the WAVES.

A Barrel of Oil and a Durable Oil Bag with capacity for a Gallon of Oil, delivered aboard Vessels in Cleveland for $10.

The bag has attachments that permit of its being slid down the anchor chains when the vessel is at anchor, or thrown to windward when the vassel is moving. As the vessel comes up to it, the bag can be hauled aboard by means of a line, and thrown ahead from time to time.

The expenditure of $10 may save your vessel.

STORM OIL BAG CO.

123 River Street, CLEVELAND, OHIO.

Patented June 11th 1878 "EUREKA" Registered No. 7231.

DON'T BE DOPEY!

HELP YOURSELF and at same time help us. "EUREKA" Packing will outlast 3 to 4 times any other.

ROBERTSON THOMPSON INDICATOR

will push you further ahead in your profession than anything else. **$40.**

Hine & Robertson Co. 40 Cortlandt St. N.Y. Send for Catalog.

An Opportunity for ENGINEERS!

An Indicators for Sale Cheap.

Calkins Steam Engine Indicator, Planimeter, Pantograph extra springs, and three way cock—full outfit for taking indicator cards—regular price $40—our price $35.

MARINE REVIEW,
516 Perry-Payne Bldg., Cleveland, O.

Handsome Photographs of Lake Steamers.

For some time the REVIEW has been planning to secure photographs of lake vessels under way, giving an artistic marine scene as well as a picture of the vessel. Arrangements have been completed and the first consignment has been received. They are 8 by 10 inches on tea colored mounts and will be sent to any address. We have a number in stock, and as more are being taken every few days we can furnish prints of almost any of the modern freight steamers at $1 each. The following are on hand

J. J. McWilliams,	J. N. Glidden,	Cherokee,	D. Leuty,
Yukon,	Wawatam,	Majestic,	F. L. Vance,
Colgate Hoyt,	Briton,	Chas. Hebard,	Selwyn Eddy,
John Harper,	Pillsbury,	Saginaw Valley,	Forest City,
Gladstone,	Maritana,	S. S. Curry,	Wallula,
John V. Moran,	Malta,	H. J. Johnson,	Jim Sheriffs.
John Mitchell,	Quito,	Choctaw,	Zenith City,
Corsica,	City of Collinwood,	Victory,	Merida,
Annie M. Ash,	Pascal,	P. Pratt.	

Send $1 to the MARINE REVIEW, 516 Perry-Payne Bldg., Cleveland, O

U. S. ENGINEER OFFICE, 213 Woodward Ave., Detroit, Mich., May 19, 1896. Sealed proposals for furnishing all Labor, Materials, and Appliances for (E) widening channel below islands at Little Rapids; (F) widening channel at Angle, foot of Hay Lake; and (G) widening channel from Dike to Angle at Little Mud Lake, will be received here until 2 p. m., June 18, 1896, and then publicly opened. Information furnished on application. G. J. LYDECKER, Lieut. Col. Eng'rs. May 21-8, Ju 4-11.

FOR SALE

60x10 ft. **STEAM LAUNCH**, 4½ Compound Engine and Condensers, Steam Pumps, etc., Kitchen, Berths, fully equipped, and in first-class order. For particulars inquire Room 65, 94 La Salle Street, CHICAGO, ILL.

..STEAM.. ENGINEERING

(Loco., Stat'y. and Marine); Electricity; Mechanics; Mechanical and Architectural Drawing; Plumbing; Architecture; Mining; Civil Engineering in all Branches.

The International Correspondence Schools

To Steam.. ..Engineers,

Machinists, Electrical Workers, Civil Engineers, Draughtsmen, Steam Fitters, Miners, Carpenters, Plumbers. *References Everywhere. Send for Circular. State Subject you wish to Study,*

Box 965 Scranton, Pa.

HARVEY D. GOULDER,
LAWYER AND PROCTOR IN ADMIRALTY,
CLEVELAND, O.

ALBERT J. GILCHRIST, PROCTOR IN ADMIRALTY,
No. 604 PERRY-PAYNE BLDG., CLEVELAND, OHIO.

C. E. KREMER, *Attorney and Counselor-at-Law and Proctor in Admiralty.*
Rooms 14, 15 and 16, Bryan Block, 164 LA SALLE ST., CHICAGO, ILL.

BROWN & COOKE,
Counselors at Law and Proctors in Admiralty,
106-107-108 White Building, BUFFALO, N. Y.

HAWGOOD & MOORE
Vessel and Insurance Agents,
W. A. HAWGOOD. J. W. MOORE.
Residence Phone, Doan 446—W. A. Hawgood. Long Distance Tel. 2395.
608 Perry-Payne Bldg., CLEVELAND, O.

J. H. BARTOW. C. P. GILCHRIST. BARTOW & GILCHRIST, TELEPHONE 717.
Vessel and Insurance Agents,
611 and 612 Perry-Payne Bldg., Cleveland, O.

ALEX. CLARK. J. B. HALL. J. H. KILLERAN, *Marine Surveyor.*
A. Clark & Co. VESSEL AND INSURANCE AGENTS,
Tel. No. 892. 55 Main St., BUFFALO, N.Y.

JOHN MITCHELL. JOHN F. WEDOW. ALFRED MITCHELL.
MITCHELL & CO.,
Vessel and Insurance Agents,
508, 509 and 510 Perry-Payne Building, CLEVELAND, OHIO
Office Telephone, 737. Reidence, John Mitchell, 3506.

C. R. JONES & CO., VESSEL AGENTS,
FIRE AND MARINE INSURANCE.
Nos. 501, 502 and 503 Perry-Payne Bldg., CLEVELAND, O.

H. S. LORD. J. H. NORTON.
LORD & NORTON,
Attorneys-at-Law, Proctors and Advocates in Admiralty,
DULUTH, MINN.

White, Johnson & McCaslin,
ATTORNEYS-AT-LAW,
—AND—
Proctors in Admiralty,
26-27 Blackstone Building,
CLEVELAND, - OHIO.

THOS. WILSON,
MANAGING OWNER
WILSON'S TRANSIT LINE.
Gen. Forwarder.
Freight and Vessel Agent.
CLEVELAND, O.

C. F. Palmer. C. L. Hutchinson
PALMER & CO.,
Vessel Agents and Underwriters,
515 Perry-Payne Bldg., Cleveland, Ohio.
Telephone 644.

The M. I. Wilcox
CORDAGE AND SUPPLY CO.
Steamboat, Vessel and Mill Supplies.
STEAM YACHT, "MINNIE D."
210-216 Water Street,
TOLEDO, OHIO.

ORESTES C. PINNEY,
Lawyer and Proctor in Admiralty.
Rooms 722 and 723 Perry-Payne Bldg.
CLEVELAND, OHIO.
Telephone 2585.

C. W. ELPHICKE. JAS. A. MYERS. A. L. FITCH.
C. W. ELPHICKE & CO.
GENERAL INSURANCE AGENTS,
Room 10, No. 6 Sherman St., Chicago, Ill.

H. J. WEBB & CO.
SHIP BROKERS, VESSEL OWNERS and AGENTS,
Established in 1856. H. J. Webb & Co. will charter vessels for the lake trade. Special attention given to chartering vessels in the Lake Superior Iron Ore trade, both for the season and single trip.
No. 606 & 607 Perry-Payne Building, Cleveland, O. Office Telephone No. 338, Residence No 3228.

J. T. ROSE. FRANK B. LAZIER.
ROSE & LAZIER,
Vessel Agents and Brokers, and Marine Insurance,
16 Board of Trade,
DULUTH, - - MINN.

VANDUZEN Steam JET PUMPS
THE BEST IN THE WORLD.
Pumps any kind of Liquid. Always in order. Never clogs nor freezes. Fully Guaranteed. COST $7 AND UPWARD. Especially useful for Mines, Quarries, Pits, Wells, Clay Pits, Breweries, on Steamships, Ferryboats, Sugar Plantations, etc. A full stock always on hand.
Descriptive Catalogue and Prices furnished Free. THE E. W. VAN DUZEN CO., Cincinnati, O.

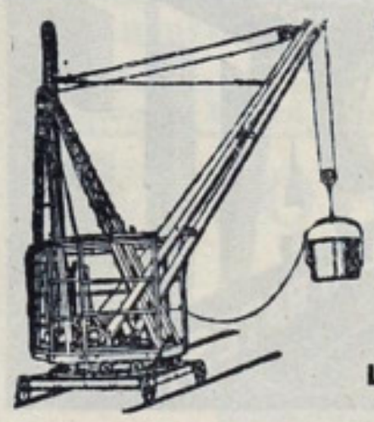
PATENTS
Promptly secured. Trade-Marks, Copyrights and Labels registered. Twenty-five years experience. We report whether patent can be secured or not, free of charge. Our fee not due until patent is allowed. 32 page Book Free.
H. B. WILLSON & CO., Attorneys at Law, Opp. U. S. Pat. Office. WASHINGTON, D.C

Pickands, Mather & Co.,

FUEL LIGHTERS AT BUFFALO, ERIE, ASHTABULA AND CLEVELAND.
At DETOUR, MICH., A FUEL DOCK equipped with Shute capacity of 600 Tons.
Best Quality PITTSBURGH COAL furnished at any time during Day or Night.
Western Reserve Building, CLEVELAND, O.

Ohio & Pennsylvania Coal Co.
FUEL DEPARTMENT.
MINERS AND SHIPPERS,
Youghiogheny and Ohio Steam Coals. Steamboats, Tugs, etc., Coaled day or night, DOCKS FOOT WEST RIVER STREET. WHISKEY ISLAND GOVERNMENT PIER and C. & P. R. R. SLIPS. Also STEAM LIGHTER—Equipped with Revolving Derrick and (100) two ton buckets.
Telephone 1608. Office, 130 West River St., CLEVELAND, OHIO.

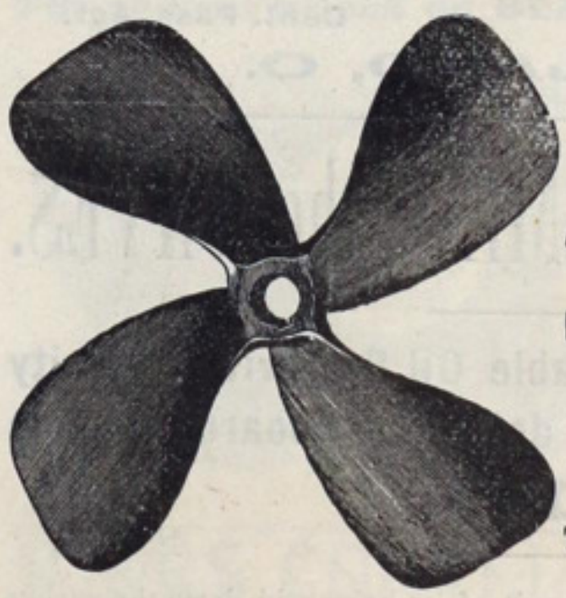
THE PITTSBURGH AND CHICAGO GAS COAL CO.
MINERS AND SHIPPERS OF
Pittsburgh and Youghiogheny Coal.
Fuel Docks West Side of Main River, Cleveland, Ohio, just above Main St. Bridge.
Latest equipment for rapid fueling of Steamers at all hours, day or night.
Fuel Lighter 300 tons capacity; buckets 2½ tons capacity.
Telephone { Office 1888. Fuel Dock 1590. Ore Dock, 2413.
J. A. DONALDSON, Agent, 420-421 Perry-Payne Building.



TOLEDO FUEL CO.,
Cambridge, Hocking, Jackson and Massilon Coal
Wheeled on or put on with DERRICK.
NIGHT OR DAY.
SATISFACTION GUARANTEED.
H. H. WLLIIAMS, Manager.
Located on Penn. Dock, TOLEDO O.
GET OUR PRICES. Phone 1441.

H. A. BARR, PRESIDENT, Escanaba. F. H. VAN CLEVE, SEC. Escanaba. CAPT. GEO. BARTLEY, SUPT. Escanaba.
ESCANABA TOWING & WRECKING CO., Escanaba, Mich.
Tugs, Lighters, Steam Pumps, Hawsers, Hydraulic Jacks and Diving Appliances always ready.
TUG MONARCH, { Engine Compound, Cylinder 16 and 30 inches diameter, 30 inch-Stroke, Steam Pressure Allowed, 125 pounds.
TUG DELTA, { Cylinder 20 by 22, Steam Pressure Allowed, 105 pounds.
TUG OWEN, { Cylinder 20 by 20, Steam Pressure Allowed, 104 pounds.
CENTRIFUGAL PUMPS, Seven and Fourteen Inch Suction

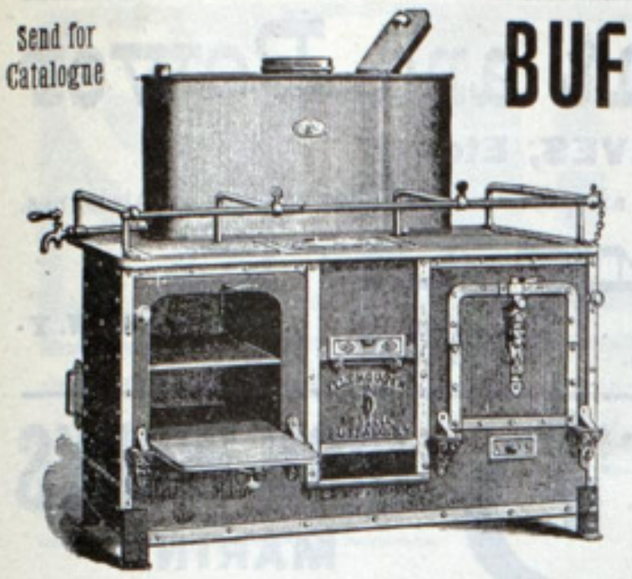
H. G. TROUT,
KING IRON WORKS,
BUFFALO, N. Y..
MANUFACTURERS OF
TRIPLE EXPANSION, THREE CYLINDER, FORE AND AFT And STEEPLE COMPOUND MARINE ENGINES,
High and Low Pressure Engines, Sectional. Propeller, Tug and Yacht Wheels,
Cowles Aluminum and Manganese Bronze Propeller Wheels.



These Wheels are noted for their extra speed, towing power and proportionate saving of coal.
PRICES QUOTED ON APPLICATION.

PRIVATE CAR FOR SALE
or Exchange for a Steam Yacht.
—FOR FULL PARTICULARS, ADDRESS—
E. D. BROWN, - 26 River St., - CHICAGO, ILLS.

Send for Catalogue



BUFFALO WROUGHT STEEL RANGES

Steamboat and Vessel Ranges and Boilers, with patent Rotary Grate.

SOMETHING NEW AND GOOD.

We also carry the STAMFORD TUG AND YACHT GALLEY STOVES.

RUSSELL & WATSON

Successors to Felthousen & Russell.

145 Main St., BUFFALO, N.Y.

PINTSCH GAS LIGHTED BUOYS

Adopted by the English, German, French, Russian, Italian, and United States Light House Departments, for channel and harbor lighting; over 500 gas buoys and gas beacons in service.

BURN CONTINUOUSLY from 80 to 365 days and nights without attention, and can be seen a distance of six miles.

Brilliant and steady illumination.
Economical and reliable in operation.

CONTROLLED BY THE

SAFETY CAR HEATING & LIGHTING COMPANY,

160 Broadway, New York City.

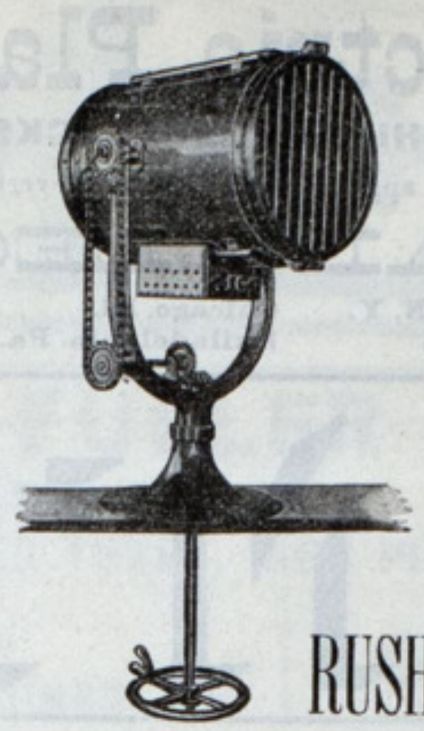
C O A L

STANLEY B SMITH & CO.
OPERATING
SMITH'S COAL DOCK
POCKET FUELING AND LOW DOCK
DETROIT, MICH.
OFFICES: DETROIT MICH.
LORAIN COAL DOCK
LORAIN, OHIO.
OPERATING
LAKE SHIPPERS OF STEAM COAL.
STEAMBOAT FUELING

C O A L

ALL NEW HYDROGRAPHIC CHARTS ARE KEPT IN STOCK BY THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND.

CAPTAINS AND MATES ARE INVITED TO CALL AT THE OFFICE OF THE MARINE REVIEW AND LOOK OVER THE CHARTS AND SAILING DIRECTIONS OF LAKES SUPERIOR, MICHIGAN, HURON, ERIE AND ONTARIO, PUBLISHED BY THE HYDROGRAPHIC OFFICE.



PROJECTORS!

10 MILLION TO 100 MILLION CANDLE POWER.

The only successful commerial light.

Adopted and endorsed by leading steamship lines and builders.

Have Replaced All Other Makes.

CATALOG NOW READY.

Type D. Pilot House.

RUSHMORE DYNAMO WORKS,

JERSEY CITY, N. J.

THE
Swain Wrecking Co.
E.M.PECK, Prest

The TUG FAVORITE
STATIONED AT CHEBOYGAN, MICH WITH COMPLETE WRECKING OUTFIT IN CHARGE OF
Capt. P. L. Millen
CANADIAN WRECKER SAGINAW
STATIONED AT DETROIT, MICH ENABLES US TO WRECK IN CANADIAN WATERS
STEAM PUMPS AND SUB-MARINE WORK IN CHARGE OF
JOHN S. QUINN.
PARKER & MILLEN
OFFICE 15 ATWATER ST. WEST. DETROIT, Mich
FAVORITE
4 STEAM PUMPS, 10 JACKS, 8 HAWSERS.
1 COAL and ORE PUMP
3-12 INCH ROTARY.
1-14 INCH WORTHINGTON.
DIVING RIGS AND DIVERS ABOARD AT ALL TIMES
1896 MAY.
10-100 TON JACKS
1-12 INCH HAWSER
1-10
1-9
Telegraph
Capt. P. L. Millen
CHEBOYGAN, MICH.
TELEGRAPH
PARKER & MILLEN,
DETROIT, MICH.

STERLING, WELCH & CO.

12 and 14 Euclid Ave., CLEVELAND, O.

BOAT FURNISHING A SPECIALTY.
CARPETS, OIL CLOTHS,
CURTAINS, &c., &c.
SUPPLIED AT WHOLESALE RATES.

MARINE VALVE OIL FOR INTERNAL LUBRICATION. RENOWN ENGINE OIL FOR EXTERNAL LUBRICATION

STANDARD OIL COMPANY, MARINE VALVE OIL, CLEVELAND, O.

Marine Valve, Renown Engine, Eldorado Engine, Crank Case, Victor Signal, Dark Lubricating, Mineral Seal, Head Light, Artic Cup Greases, and Lard Oils.

— CARRIED IN STOCK AT THE —

STANDARD OIL COMPANY'S MARINE DEPOT,

TELEPHONE 77. 123 River Street, CLEVELAND, O. MAIN OFFICE TELEPHONE 682.

ALSO FOR SALE BY **STANDARD OIL COMPANY,**

Chicago, Ill., No. 5 Wabash Ave.
Racine, Wis.
Milwaukee, Wis., Broadway & Mason.
Sheboygan, Wis.
Manitowoc, Wis.
Green Bay, Wis.
Marinette, Wis.
Oshkosh, Wis.
Duluth, Minn.
West Superior, Wis.
Hancock, Mich.
Marquette, Mich.
Buffalo, N. Y.
Sault Ste. Marie, Mich.
West Bay City, Mich., M.C.Ry. & 10th St
Saginaw, Mich., Eighth & Sears Sts.
Detroit, Mich., 46 Jefferson.
Toledo, O., Summit & Monroe Sts.

ATLANTIC REFINING COMPANY, French & 16th Sts., Erie, Pa.
D. ROBESON, Port Huron, Mich.
W. S. MCKINNON, Ashtabula Harbor, O.
HULL & RAND, Huron, O.
EDWARD BRAMMALL, Bnton Harbor, Mich.
BABY & DALE, St. Clair, Mich.
N. C. ALTEN, Lorain, O.
A. F. HARRINGTON, Conneaut Harbor, O.
A. H. MCGONAGIL, South Chicago, Ill.
MARINE SUPPLY CO., Fairport, O.
F. KRANZ, Sandusky, O.
THE M. I. WILCOX CORDAGE & SUPPLY CO., Toledo, O

STANDARD OIL COMPANY, RENOWN ENGINE OIL, CLEVELAND, OHIO.

Complete Electric Plants for Light and Power

On STEAMSHIPS, WHALEBACKS, YACHTS, DOCKS, WHARVES, Etc.

Our system is complete in every detail. All our appliances are made to Governmental and Insurance requirements and are perfect. Write for prices and catalogues.

GENERAL ELECTRIC COMPANY.

SALES OFFICES: { Schenectady, N. Y. Boston, Mass. Chicago, Ill. Philadelphia, Pa. Detroit, Mich. Baltimore, Md. Buffalo, N. Y. Portland, Ore. Columbus, O. San Francisco, Cal. New York, N. Y.

FRONTIER IRON WORKS

MARINE ENGINES,

DETROIT, MICH.

STEAMBOAT CAPTAINS ENGINEERS, CREWS,

BUY RAILROAD TICKETS

READING

Flint & Pere Marquette R. R.

WHEN GOING TO

SAGINAW BAY CITY, MANISTEE, LUDINGTON, MILWAUKEE.

SHORT LINE.

CHEAP RATES.

A. PATRIARCHE, Traffic Mgr.

SAGINAW, MICH.

JOHN DODD,

Sub-Marine Diver.

Headquarters at

St. Ignace and Mackinaw, Mich.

FOR SALE at a Bargain.

The tug Henry—Cylinders, 16½x18; new steel boiler; steel boiler house; hull in first-class condition. This is a most favorable opportunity to procure a first-class tug for dredging outfit. For particulars apply to **WILLIAM TRUBY,**

Fairport Harbor, O., where tug can be seen.

Wanted Three Good Engineers

For propellers on Chautauqua Lake. Wages $75 per month.

Call on or address

T. E. GRANDIN, Gen'l Supt. Chautauqua Steamboat Co.,

May 8. Jamestown, N.Y.

For Sale

By The Middletown & Portland Bridge Co., the following boats lately used by them for the ferry over the Connecticut river, connecting Middletown and Portland.

Steamer Brownstone:

91 ft. long, 40 ft. beam, draws 6 ft. of water; tonnage 253 gross and 127 net; burns about 1½ tons of coal per 15 hours; fitted with two condensing engines; speed about 9 miles per hour.

Steamer Gildersleeve:

60 ft. long, 15 ft. beam, draws 4 ft. of water; tonnage 23 gross, 22 net.

Have with same, 1 large scow and two landing bridges.

The whole are in good condition, having been lately used by us, but as we have no use for them, their place being taken by a bridge.

THE MIDDLETOWN & PORTLAND BRIDGE CO.

F. L. WILCOX, Treas. East Berlin, Conn.

The COAST LINE to MACKINAC

TAKE THE

TO MACKINAC DETROIT PETOSKEY CHICAGO

2 New Steel Passenger Steamers

The Greatest Perfection yet attained in Boat Construction—Luxurious Equipment, Artistic Furnishing, Decoration and Efficient Service, insuring the highest degree of

COMFORT, SPEED AND SAFETY.

FOUR TRIPS PER WEEK BETWEEN

Toledo, Detroit and Mackinac

PETOSKEY, "THE SOO," MARQUETTE, AND DULUTH.

LOW RATES to Picturesque Mackinac and Return, including Meals and Berths. From Cleveland, $18; from Toledo, $15; from Detroit, $13.50.

EVERY EVENING

Between Detroit and Cleveland

Connecting at Cleveland with Earliest Trains for all points East, South and Southwest and at Detroit for all points North and Northwest.

Sunday Trips June, July, August and September Only.

EVERY DAY BETWEEN

Cleveland, Put-in-Bay and Toledo

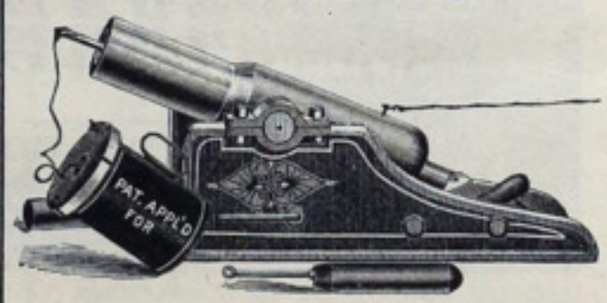
Send for Illustrated Pamphlet. Address

A. A. SCHANTZ, G. P. A., DETROIT, MICH.

The Detroit and Cleveland Steam Nav. Co.

Lyle Line Carrying Gun.

ESTABLISHED 1826.



For Steamships and Tow Boats

of best Bronze Gun Metal and FACSIMILE of the Government Regulation Line saving Gun, mounted on handsome iron carriage and complete with PATENT REEL for Line, and accompaniments, furnished by us to the "Cunard," the "Pacific Mail," "Warren Line," "Cramps of Philadelphia," "Philadelphia and Reading Co." "Leyland," "Atlantic Transport," and many other steamship lines.

This gun is of **superior** quality and conforms to full Government tests. Can be used for salutes as well as for life saving, also is invaluable for throwing a line to a wreck at sea. Also fine Bronze Yacht Guns—all kinds.

Send for Circular and Price List.

Also "Scotts," "Wesley Richards," and all makes FINE HAMMERLESS DOUBLE GUNS, and every article in the line. Send for our catalogue.

WILLIAM READ & SONS

107 Washington St. BOSTON.

FOR SALE

The Steam Car-ferries **"HURON"** and **"INTERNATIONAL"**

Owned by the Grand Trunk Railway Company.

	"HURON"	"INTERNATIONAL"
Length over all	239 ft.	225 ft.
Beam	44 "	40 "
Depth of hold	14 "	12 "
Draft, loaded	11 "	10 "

Both boats are built of iron, and are equipped with twin screws, with independent engines and boilers.

Particulars may be obtained from **A. B. ATWATER** or **H. ROBERTS, Grand Trunk Railway, DETROIT, MICH.**

The United States Standard Register of Shipping.

Providing the only Standard Classification based on Construction Rules Designed for Lake Vessels.

Classed Vessels Receive the Lowest Rates of Insurance.

SURVEYORS.

SINCLAIR STUART, Surveyor of Iron and Steel Construction and Engineer Surveyor.

.....Surveyor for District comprising Lakes Superior, Michigan and Huron and Lake Erie, as far East as, and including Cleveland, O.

EDWARD CASKIN, Potter Building, Main Street, Buffalo, N. Y., Surveyor for District comprising Lake Ontario and Lake Erie, as far West as, but not including Cleveland, O.

Application for survey of vessels and subscriptions to Register Book will be received by the surveyors or at the office of

The United States Standard Steamship Owners', Builders' & Underwriters' Ass'n, Ltd

Post Building, 16 and 18 Exchange Place, . NEW YORK.

S. F. HODGE & CO.

MARINE ENGINES,
PROPELLER WHEELS,
DECK HOISTERS,
MARINE REPAIRS.

320 ATWATER STREET,
DETROIT, MICH.

BAR IRON — THE BOURNE-FULLER CO. — PIG IRON

CLEVELAND, O.

BOILER RIVETS, BOILER TUBES, IRON PIPE,

BOAT SPIKES,
CLINCH RINGS, &c.

HIGH GRADE MATERIALS FOR VESSEL CONSTRUCTION A SPECIALTY.

SALES AGENTS:
THE CARBON STEEL CO.
MANUFACTURERS OF
OPEN HEARTH STEEL
SHIP, BOILER, BRIDGE AND TANK PLATES, &c., &c.

SALES AGENTS:
THE CAMBRIA IRON CO.
MANUFACTURERS OF
OPEN HEARTH AND BESSEMER STEEL
ANGLES, BARS, CHANNELS, BEAMS, TEES, ZS, &c.

THE BEST IS WHAT YOU WANT

ASK FOR IT.

PEERLESS STEAM AND WATER HOSE

....MANUFACTURED EXCLUSIVELY BY THE....

PEERLESS RUBBER MFG. CO.

16 WARREN STREET, NEW YORK.

FOR SALE BY

LEADING SHIP CHANDLERS AND SUPPLY HOUSES.

De Grauw, Aymar & Co.,
34-35 South Street,
NEW YORK, N. Y.

Sole Selling Agents in the United States for

TYZACK'S STOCKLESS ANCHORS

Over 40 of these Anchors on Lake Vessels.

The McIntosh-Huntington Co.,

CLEVELAND, O.

PENBERTHY INJECTORS,
DAVIS PRESSURE REGULATORS,
RAINBOW PACKING,
VALVES AND FITTINGS. VACUUM PACKING.

THE GEO. F. BLAKE MFG. CO.

BUILDERS OF

MARINE PUMPS

Single and Duplex Pumps for Boiler Feed, Fire or Bilge Service—Vertical and Horizontal.

Vertical and Horizontal Pumps, Air Pumps for Surface and Jet Condensers.

AIR PUMP ON U.S. CRUISER NEW YORK.

95 and 97 Liberty St., NEW YORK.

—THE—

Bethlehem Iron Company

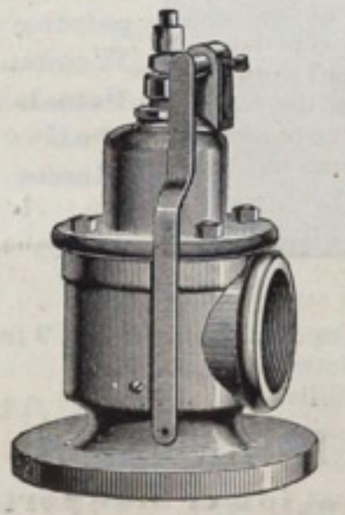
PRINCIPAL OFFICE and WORKS:
SOUTH BETHLEHEM, PENNA.

Steel Forgings of all descriptions

For Marine Engines

Fluid Compressed, Hollow, Hydraulic Forged and Annealed Forgings a Specialty.

NEW YORK OFFICE, - - 100 Broadway.
PHILADELPHIA OFFICE, - 421 Chestnut St.
CHICAGO OFFICE, - - Marquette Bldg.



CROSBY STEAM GAGE AND VALVE CO.,

Sole Proprietors and Manufacturers of

Crosby Pop Safety Valves and Water Relief Valves, Crosby Improved Steam Gages, Single Bell Chime Whistles, Patent Gage Testers, Victory Lubricators, and other specialties.

The Crosby Steam Engine Indicator, when required, is furnished with Sargent's Electrical Attachment, by which any number of diagrams can be taken simultaneously.

BRANDEN PUMP VALVES, rubber with wire-coil insertion.

Manufacturers of all kinds of Pressure and Vacuum Gages, Water Gages, Gage Cocks, Radiator Cocks, and other Engine and Boiler Fittings and Supplies.

Branch Offices at New York, Chicago and London, Main Office and Works at BOSTON, MASS

Bertram's Oil Polish. The Marine Polish of the World.

For Brass and all Metal Surfaces it is unequalled. It is cheaper, requires less work and retains it brilliancy longer than any metal polish made. Acknowledged the standard of excellance by the U.S. government in the marine departments. For sale by ship chandlers and engineers supplies stores. BERTRAM OIL POLISH CO.,220 & 22 State St.,BOSTON,MASS.

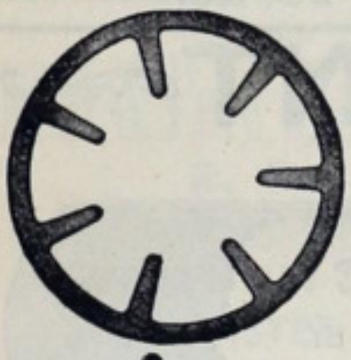
CLEAN BOILERS MEAN LOW FUEL ACCOUNTS.

The Empire Boiler Cleaning Co.'s System of Boiler Treatment.

WHAT THEY SAY OF IT : CLEANS AND KEEPS THE BOILER CLEAN, PREVENTS SCALE, CARROSION AND PITTING.

'It has accomplished all that the parties have claimed for it."
Frank Soop, Supt. Engineer, New Haven Steamboat Co.
"The best that we have found for the purpose."—The Bartholomay Brewing Co., Rochester, N.Y.
"We are pleased to recommend it to anyone owning a steam plant."
The Enterprise Printing Co., Cleveland, O.
"It is by far the best that we have ever used."—The Mahoning Valley Iron Co., Youngstown, O.
"It is all right."—H. C. Doman, Oshkosh, Wis.
"The system is a most economical one, and one that recommends itself to a well posted boiler man."
Thomas Shehan, formerly Chief Engineer, Mutual Trans. Co., Cleveland, O.

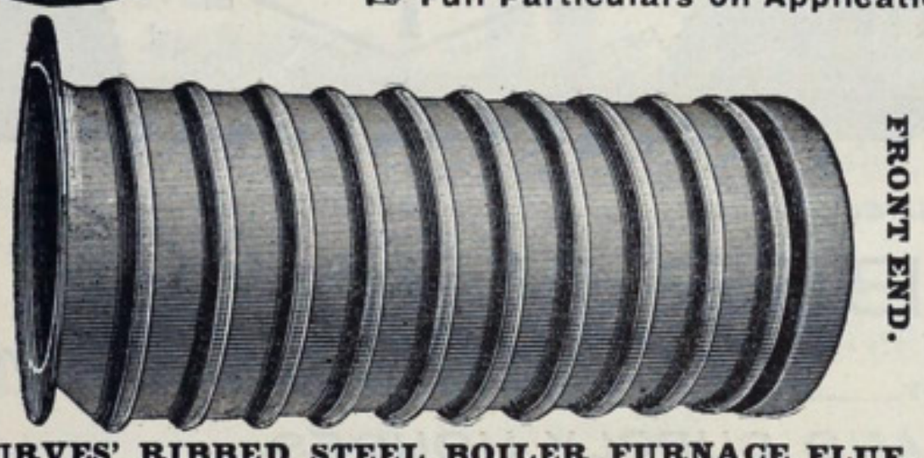
TELEPHONE 2241 Full information furnished upon application. ALEX C. BATES Agent, Wade Bldg., Cleveland, O.



Serve's Steel Ribbed Boiler and Stay Tubes

Show an average economy in fuel of 15 per cent. In steamers this means not only so much saving in cost of coal or increased power, but additional freight capacity.

☞Full Particulars on Application.



PURVES' RIBBED STEEL BOILER FURNACE FLUE.

With this style of Furnace Flue the rivets at the "back ends" are out of the line of fire, and all that has to be done to remove it is to cut out the rivets at the ends and slip it through the front; and to replace it, simply to slip it back in its place and rivet up the ends again without disturbing any part of the boiler. No smithwork is required to fit it on a boiler or to refit it when replaced. It is ready for use as it comes from the manufacturers. This style of flue has been in use six years without a single complaint.

Over 14,000 of Purves' Ribbed Steel Furnace Flues in successful use in Marine Boilers.

Ellis & Eaves System of Induced or Suction Draft.

CHARLES W. WHITNEY, Sole Agent for the United States and Canada, 64, 66, 68 BROADWAY, NEW YORK

H. W. Johns' Boiler and Pipe Coverings.

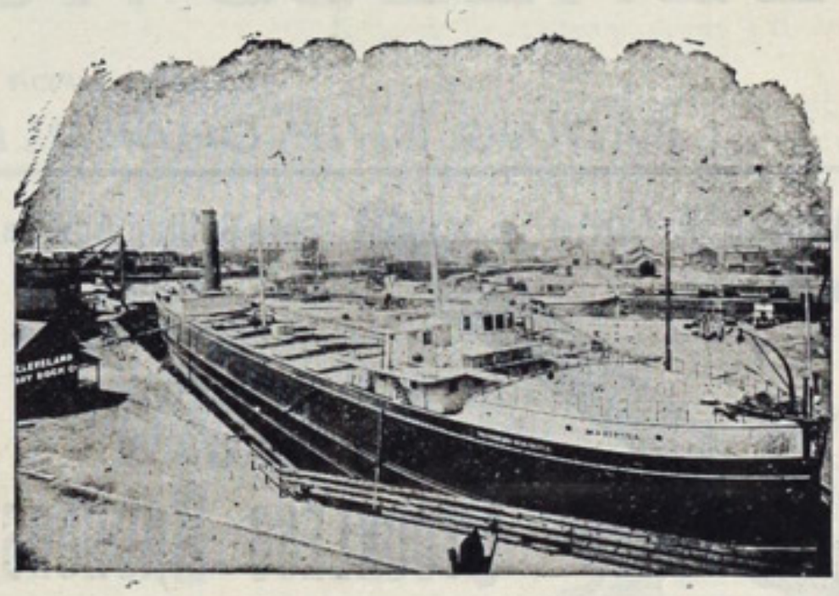
ASBESTOS MATERIALS OF ALL KINDS,
Wicking, Fibre, Mill Board, Felt, Packing, Cement, Liquid Paints, Roof Paints, Fire-Proof, Paints, etc.

Made in Sections Three Feet Long, to Fit Every Size of Pipe.

ABSOLUTELY FIRE-PROOF.

THE CHASE MACHINE CO. 111 ELM ST. CLEVELAND, O. H. W. JOHNS MFG. CO 32 SOUTH WATER ST.

The Cleveland Dry Dock Co.



148 Elm St., Cleveland, O.
Telephone 1616.
Resid. 'Phone 4080.

REPAIRING A SPECIALTY.

Dimensions of Dock:
Lth. over all, 360 ft.
Lth. on blocks, 340 ft.
Width of gate, 50 ft.
Depth over sill, 20 ft.

Capt. W. W. BROWN
Sec'y & Mgr.

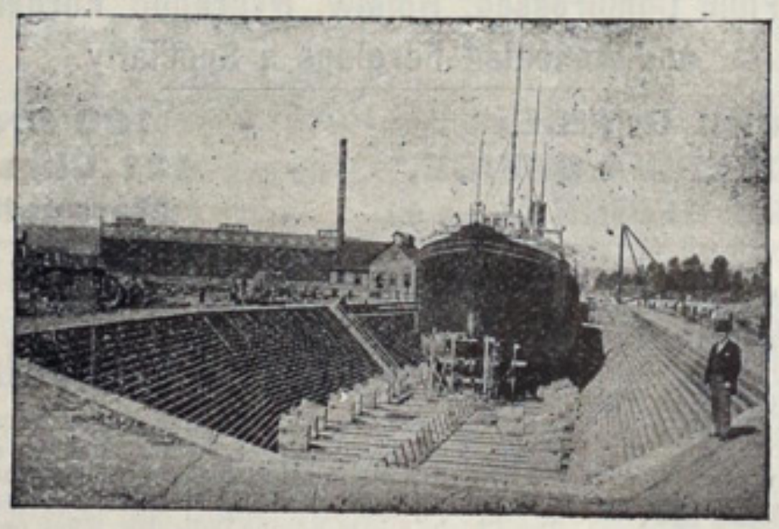
AMERICAN STEEL BARGE CO.

STEEL and METAL SHIPS

Of all classs built on the Shortest Possible Notice at our yards at

West Superior, Wis., and also at Everett, Wash.

Photograph of 300 ft. Boat in Dock.



Plates & Material Always on hand to Repair all kinds of Metal Ships in Shortest Time.

Best Quality of Oak instock for Repairing Wooden Vessels of all Classes.

SIZE OF DOCK.

Length, extreme	537 feet.	Entrance, Top	55 feet 9 in.
Breadth, Top	90 " 4 in.	Entrance, Bottom	50 "
Breadth, Bottom	52 "	Depth over Sills	18 "

LARGEST DRY DOCK ON THE LAKES.

Prices for Repairs and Docking same as at lower lake ports

SUPERIOR, WIS.

A number of Propellor Wheels in stock at Dry Dock.

Cleveland City Forge & Iron Co.

CLEVELAND, O.

Iron and Steel Forgings

J.H. PARSONS CHEMICAL CO. TRADE A·B·C MARK CHICAGO, ILL.

ALKALI WATER PURIFIER!

A Pure Chemical for the safe Removal and Prevention of Scale in Steam Boilers. In use by many of the larger Steamship lines on the great Lakes. Guaranteed

MANUFACTURED BY
THE J. H. PARSONS CHEMICAL CO.,
1509 Masonic Temple, CHICAGO, ILL.